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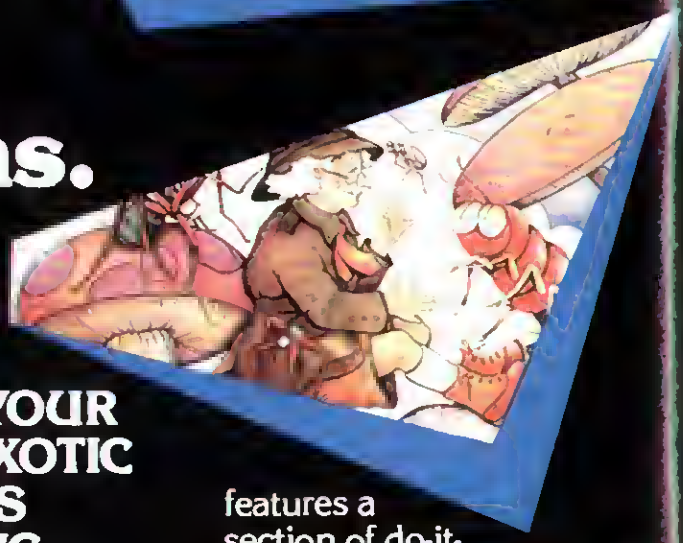

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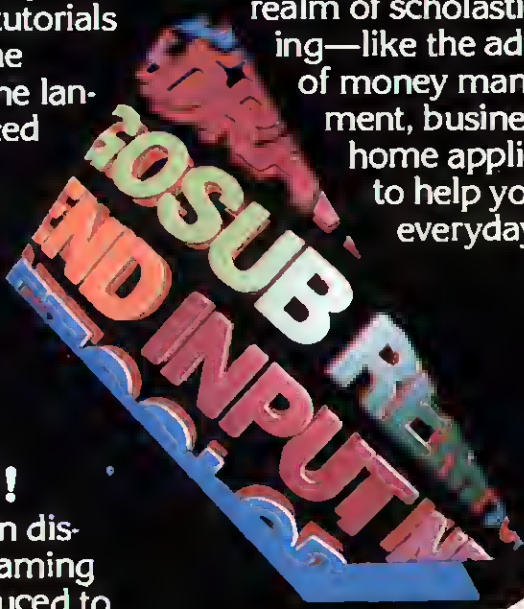

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It will keep you at the leading edge of computer technology. And the *Explorer* doesn't just cover the serious stuff. We also feature the human side of computing—real people using their computers for some very interesting projects.

So whether you want to perform reconnaisance on your computer's memory banks or recall your Aunt Maggie's cherry pie recipe, you'll want to explore our pages.

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Editorial

This issue of Atari's magazine is different from the ones that came before. It reflects the changes in the company during the past six months. A new management team, made up of savvy veterans of the home computer business and led by Jack Tramiel, is determined to bring Atari to the "number one" position in the home computer business.

The Tramiel philosophy of business means that Atari builds computers for lower costs than ever before (thanks to shrewd buying and high-volume production) and passes the savings along to you. Atari's traditions of breathtaking graphics technology, reliable hardware, and customer service still continue. This is the start of a new era for Atari and for you, the Atari computer community. For more on the new Atari and our new products, just look inside this issue. The first detailed look is found here.

We've changed the magazine's name from ***The Atari Connection*** to ***ATARI EXPLORER***. The new name signals a new emphasis on the user community and on exploring the infinite possibilities of Atari computers. We're not just a "house organ", we're dedicated to serving and supporting you with new ideas, reviews, and practical advice for getting the most from your home computer. Think of us as your tour guide to the Atari universe.

This doesn't mean that we're changing completely. You will still find the most accurate and up-to-date news for the Atari computer community. The experts from inside and outside of Atari are still featured here. ***ATARI EXPLORER*** has the best features of the Connection while adding stronger material for you.

The best of the old and the best of the new. Not a bad way to look at the changes that have occurred to your favorite computer company. The new idea that computers can be as affordable as they are powerful is combined with the support and technology of the old Atari.

Speaking of support, some of you may have experienced some "glitches" during the transition period when trying to get help from us. Rest assured that this was only a temporary condition. By the time you read this, our telephone lines will again be fully staffed to answer your questions and dispense information.

The program of user group support is also coming together again, although it might not be 100% as yet. Meanwhile, this magazine will serve as the focal point for user groups. You'll find a new column called "User Friendly," just for you. New user groups should write me with a description of your activities. Please keep those newsletters coming too, and let me know if we're allowed to reprint material from them for the benefit of all Atari users. I read every one that comes in; you are important to us.

Now that the facts are available, I'm sure you'll agree that prospects are rosy for all Atari people. So, welcome to the new Atari—and the new ***ATARI EXPLORER*** magazine.

Neil Harris, Publisher

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One of-a-kind Bookstore

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Looking for a book on robotics? On ATARI BASIC or computer graphics? Would you like to find them all in one store? Computer Literacy Book Shop, in the heart of California's "Silicon Valley," is just what you need.

Now open a little over a year, Computer Literacy offers both computer professionals and novices the largest and most up-to-date collection of computer technology literature available under one roof. With more than 15,000 volumes and 4,500 different titles, the store is the only bookshop in the country that specializes in literature on computers and electronics.

Computer Literacy stocks everything from introductory computer manuals and buyers' guides to advanced books on computer math and circuit design. The store is arranged topically. So, you'll find shelves full of books under "robotics," "time management," "jobs," "graphics," and "music," for example. There are separate sections on books applicable to Atari computers as well as programming languages, computer applications and technology, and networking. You can also find racks filled with all of the major computer magazines on the market and, in the back of the store, a separate bargain room of used books and magazines.

"We read books, reviews, and catalogs to keep our inventory up to date," say co-owners Rachel Unkefer and Dan Doernberg, who attended Duke University. Unkefer majored in Latin American studies and designed printed circuit boards before she and Doernberg, who has a psychology and programming background, founded Computer Literacy in March, 1983.

Besides stocking up on computer literature, owners Dan Doernberg and Rachel Unkefer provide a special ordering and delivery service. If you want a book and they don't have it, they'll track it down and mail it to you. The store also features free monthly seminars with speckers from local high tech firms and universities.

For more information, contact Computer Literacy Book Shop, 520 Laurence Expressway, Suite 310, Sunnyvale, CA 94086 (408) 730-9955. Hours: Monday-Friday, 9:30 AM-8:00 PM; Saturday & Sunday, 10:00 AM-6:00 PM.

BACH BEATLES & BYTES

Illustrated by FRANK CIROCCO

An Introduction to MIDI

What MIDI Is

Say you're a musician. You have a few electronic instruments of various types from different manufacturers. You write a multi-part composition, but no one's around to play it with you, so you hook up your computer to your electronic instruments, play the different parts on the various instruments to record them. Then you sit back and listen while every instrument in the house plays your new song.

You've been using MIDI.

"The Musical Instrument Digital Interface (MIDI) is a hardware and software specification for digital data communication between musical instruments, recording and effects devices, and computers."* In other words, it is a standard for Input/Output (I/O). MIDI is a standard that, if incorporated into a device, allows it to "talk" to any other device that has MIDI. It consists of some interface circuitry and an electronic "grammar" to carry information between instruments.

The MIDI specification was proposed to solve the problem of instrument compatiblity. The idea of a standard was agreed at a conference of 11 manufacturers in January of 1982. MIDI was made public in an October 1982 issue of *Keyboard* magazine. The first keyboard that included MIDI, a Sequential Circuits Inc. Prophet 600, was shipped in December of 1983. Before MIDI, electronic instruments from different manufacturers were developed along different lines. It was difficult if not impossible to connect two different brands of keyboards. With MIDI, it is easy. Using two DIN 5-pin cables (180 degree), connect the port labeled "MIDI OUT" on the keyboard you want to play (called the master) to the port labeled "MIDI IN" on the keyboard (called the slave), and vice versa (some instruments have a "MIDI THRU" jack). That's it. The notes you play on one keyboard will come out of both instruments.

Here are some technical specifications of the MIDI interface:

The interface is serial (like RS-232). This means that it uses only one cable to transmit data, as opposed to a parallel interface, which uses eight. It operates at a speed of 31.25 kBaud (31,250 hits per second), asynchronous. The MIDI controller can assign up to 16 channels. Each channel can control one and only one instrument or voice on an instrument. This means that a maximum of 16 instruments can be connected to a controller, if each instrument only has or uses one voice.

This new standard is causing a lot of excitement among music professionals. "MIDI is to musical instruments what RS/232 was to the computer. It's a serial connection that allows them to communicate" said Bob Moore, president of Hybrid Arts, which produces MIDIMATE, an interface and software package that works with any Atari 8-bit machine (such as the 600, 800, and 65XE) with 48k. Moore, who is a professional recording engineer and musician, is enthusiastic about the future of MIDI. "MIDI is a new industry that will put music in every home." Whether or not MIDI becomes that popular remains to be seen, but many manufacturers are equipping their instruments with MIDI. Some of these companies are Sequential Circuits, Inc., Roland, Yamaha, Kawai, Casio, Seiko, PPG, Ensonic, Oberheim, and Korg.

MIDI is not yet a perfect method of communications between instruments, however. According to Jim Parry, manager of audio systems development at Atari, MIDI packages from different manufacturers handle advanced features (such as tone-bending) differently, so that when connected through MIDI, the full capabilities of each instrument are not realized. "They can communicate, but their capabilities are a subset of each" he said. Parry also said that these problems should clear up in time, as the standard is defined.

The MIDI standard is not confined to instruments. Computers can incorporate MIDI also. This opens up a whole range of possible uses. The computer can store music on disks. Instruction disks can be made which play a song, record the students attempt, then play both together. Most exciting of all, the computer can perform the same function as a multi-track recorder by storing the digital signals sent to it by MIDI-equipped instruments as separate "tracks", which can be manipulated by a computer that "talks" MIDI.

Atari 130 ST to Contain MIDI package

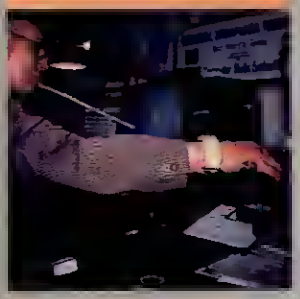
The new 130 ST "talks" MIDI. It can send commands and recieve data from any MIDI instrument. Differences in various manufacturers MIDI packages can be compensated for.

"The 130 ST is a *controller*. The only commands it accepts are under user-programmable software control. Therefore, with the appropriate software, it can interface with anyone's MIDI instrument, no matter how non-standard the commands" said Leonard Tramiel, Atari V.P.

Because of its large built-in and external memory, and high processing speed, the machine can handle a small score for 16 instruments. "We think MIDI is going to be very important" said an Atari source. "We want this to be a fun machine."

By P.R. Adler

Masonite, Glue & Computers



Taking the "Baling wire and Band-Aids" approach to available technology, a private organization called the Center for Computer Assistance to the Disabled (C-CAD) is working to improve the quality of life of the disabled in the Texas Metroplex.

The aim of the C-CAD is to get as many disabled as possible into the workforce by giving them a computer. "The computer becomes an intellectually stimulating companion" said John S. (Jack) Kishpaugh, chairperson of C-CAD. "Once they have some realization of its potential they become curious about what they can do with their lives."

C-CAD uses existing technology to help its clients back to the workforce. Often, their innovations are usually low-tech, using such materials as Lucite, Masonite and specially shaped pieces of metal to adapt existing machines. "We learned early on that many problems can be solved in the home with common sense" Kishpaugh said.

"People want to come back to work now, and we want to do what we can to make that happen." said James H. Muller, first vice-chairperson of C-CAD. Muller has worked extensively building hardware for C-CAD clients, combining off-the-shelf items with excellent results. One problem solved was the difficulty of those with cerebral palsy who cannot control their vocal cords. Muller's answer: a Casiotone keyboard with Masonite extensions glued to the keys and a cordless mike attached. The mike is tuned to a voice input module on a computer. The computer, in turn has a speech synthesis module running. The user hits the keys, and the computer dials the telephone and delivers a synthesized message. "A computer can be trained to recognize sound,unique sound" said Muller. "The tone could represent any command or program that you can activate via keyboard." He reports about 98% success with this system.

Another aspect of computing that C-CAD adresses is cost. They try to keep them as low as possible. "What about the disahled person that wants to come back to the workforce hut only has hundreds, instead of thousands, of dollars to spend?" Muller said. Manufacturers are developing fantastic products hut there are horrendous price tags."

The C-CAD approach works. Some success stories: Gene Reilly, a woman in her 40's with cerehral palsy who has a computer on loan from C-CAD with a specially-adapted keyboard and programming that enables her to do word processing from her home. Ronald Ballard, who is paralyzed from the neck down, runs a collection agency out of his home. Mr. Ballard owns his own computer, which was modified with .help from a friend. but got a lot of support and advice from C-CAD. "C-CAD was there to encourage, to advise. They helped me go on and pursue."

Unmodified computers can help the disahled. too. Take the case of Billy Yaws,

who suffers from Hurler's Syndrome (gargoylism) and deafness. He has a computer from C-CAD, and it has changed his life. According to his mother, Alice (Mickey) Yaws. Billy has worked through two TI/99 programming manuals. "I'll sit there and argue with the computer, but he'll patiently work and work and work until he gets it right."

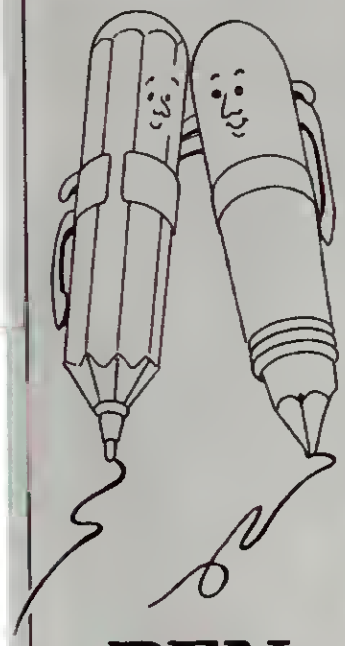
The Center for Computer Assistance to the Disabled is not a large organization. They have a small suite of offices in Arlington, one paid employee, and a new IRS tax exempt status. They are already getting a larger number of referrals than they can handle, but are trying to expand their hase of operations through fundraising, Kishpaugh said. At the beginning of November, C-CAD was serving 36 clients, and hopes to expand the number of clients served to 100 by the end of 1985.

Call The Midnight Turtle for More

To help spread information about the possihilties of personal computers, C-CAD has posted a list of computer-related resources for the disabled on *The Midnight Turtle*, the bulletin board of the Young People's Logo Association. The resource list includes manufacturers, software companies, and a bihliography of articles and books of interest to the disabled. Messages may he posted and will be answered.

The Center for Computer Assistance to the Disabled can be reached by writing, P.O. Box 314, Hurst, Texas 76053, or calling 1-817-640-6613. The Midnight Turtle, the Young Peoples Logo Association Bulletin Board, can be reached by dialing 214-783-7548. Board #6 is C-CAD.

by P.R. Adler



CALL FOR PROGRAMS

From our science desk comes news of a new computer publication for natural scientists which is looking for independently-written programs to review.

Science Software Quarterly's primary function, according to Executive Editor Diana J. Gabaldon, is to review software applicable to natural scientists. "More and more scientists are using computers in their work. Besides specialized scientific programs, these people need data base handlers, word processors, spreadsheets, graphics, and communications software."

In addition to publishing reviews of independentally-written programs, *Science Software Quarterly* also provides its readers with reviews of available commercial software with scientific applications, an open forum for advertising "custom" science software, tips on hardware, features on learning and training resources, and discount sources of "brand name" software.

The cost for an individual subscription is $45/year and for an institutional/organizational subscription, $98/year.

For more details, contact SCIENCE SOFTWARE QUARTERLY, Center for Environmental Studies, Arizona State University, Tempe, AZ 85287.

PEN PALS for Logo Classes

Logo teachers who wish their students to correspond with others in far places—and know that the pen pals have similar interests—can join the *Logo Class Penpal Network*. The network matches participating Logo teachers and their classes according to grade level, Logo experience, interests, and computer capability. Penpals come from various regions of the USA, Canada, or one of several overseas countries.

The network is run by the *National Logo Exchange*, a monthly newsletter for teachers who use Logo. Interested teachers can join by sending away for a free application kit. Send a self-addressed stamped envelope with enough postage for a 1-ounce envelope to:

The National Logo Exchange, Logo Class Penpal Network, P.O. Box 5341, Charlottesville, VA 22905

By P.R. Adler

Dial Up Digest

Bulletin Board Newsletter Now Available Online

By P.R. Adler

Modem maniacs will be happy to know that they never have to leave their chairs to read *Plumb*, a newsletter that covers bulletin board services (BBS) and personal telecommunications. It is now available online through NewsNet (see Winter 1984 *Atari Connection*).

Reporting eight times a year, *Plumb* provides some very interesting bulletin board information. Regular areas covered include education, professions, business, pirate and adult BBS. Some examples from their October issue: A bulletin board in Colorado Springs where students, teachers and parents all debate about high-school prom policy; an Ohio shortwave radio BBS; Story, a California BBS where writers get to start and finish each other's stories; and "Castle Darkskull", an Atari board for rule-playing games.

The newsletter tries to stay current. "People put up a bulletin board one day and take it down the next." said Ric Manning, *Plumb* editor. "That's the problem with the books and the lists." *Plumb* covers so many bulletin boards, however, they have produced quite a list themselves. Subscribers will receive, sometime in 1985, a booklet of close to 1000 boards covered in 1983, says Manning.

Plumb started two years ago, when its Kentucky founders (who prefer to remain anonymous) started calling bulletin board numbers listed on Compuserve and found most of them were invalid. They got in touch with the boards that were still in business, left messages on Compuserve and The Source that announced their desire to know of any new boards, sat back and read their electronic mail.

"When someone buys a personal computer, they are going to look around for things to do" Manning said. "Telecommunication is the great equalizer. It doesn't matter what kind of computer you have, you can just dial up and communicate. . . We did a poll of board operators and the biggest problem was crowded access."

Plumb costs $26.50 for 8 issues and is available from Riverside Data Inc, P.O. Box 300, Harrods Creek, KY 40027 Electronic mail may be left at Source # STQ007 and CompuServe # 72715,210.

A NewsNet ID is available by writing the service at 945 Haverford Road, Bryn Mawr, PA 19010.

EDUCATION NEWS ROUNDUP

Guide to free materials for educators available

The second annual **Guide To Free Computer Materials** for educators is hot off the press. This new and revised edition for 1984 promises to be even more comprehensive than last year's. The GUIDE lists materials covering all aspects of computing available to schools, libraries, and industries without cost other than transportation charges for one year.

For more information, contact Patricia H. Suttles, Publisher, Educators Progress Service, Inc., 214 Center Street, Randolph, Wisconsin 53956.

Computing Teacher publishes special issue on computer equity

The Computing Teacher, the journal of The International Council for Computers in Education (ICCE), devoted its April, 1984 issue to the sensitive issues of computer equity. It includes 21 articles covering such topics as economic, sex, and age equity, and access to computers by those with special needs as part of the larger issue of equity of access to education.

To underline the importance of this issue, the publishers sent a copy of the publication to each member of the United States Congress, and to special education and resource centers across the country.

The Computing Teacher is geared to elementary and secondary teachers who use computers in the classroom or are interested in their impact on education generally.

To order a single copy of the April issue, send $5.00 to The International Council for Computers in Education, Equity Issue, University of Oregon; 1787 Agate Street, Eugene, OR 97403.

LISTING THE LITERATURE

Compilation of Computer Books in Print

Readers and researchers of computer literature will be pleased to know that the R.R. Bowker Company has published *Computer Books and Serials in Print 1984.* This 551-page volume gives full publication information on over 13,500 U.S. and foreign publications.

Computer Books and Serials in Print is published with goal of making it easy for the reader to find data on the specific publication they need. To do this, the book is first arranged into the areas of Computers and Computer Applications, and then listed under such subject headings as Computer Graphics, Computers and Children and Atari—general and Atari 800. Exhaustive indexes—by subject, author, and title for books, and by title and subject for serials—further aid the reader.

"It has only been recently that there has been this explosion in computer books and serials enough to warrant an entire book devoted strictly to computer books and serials," said Paul Iacono, the publicity manager for R.R. Bowker company. "It also includes newsletters, and users group newsletters, and complete contact information. It is an extremely handy book for those who are interested in this field" Iacono said.

Rudolph Langer, editor-in-chief of Sybex books, was encouraged by the release of *Computer Books and Serials in Print.* "It could mean that Bowker now believes in the permanence of the field" he said. He was not certain of the usefullness of the new book as a resource for the average computer user, because there is no qualitative information in the listings. "Some people might find it a useful tool for research."

Another helpful feature of the book is a separate Publishers and Distributors directory which provides full contact information for all those whose titles are represented.

Computer Books and Serials in Print 1984 costs $49.50 and is available from R.R. Bowker Company, P.O. Box 1807, Ann Arbor MI 48106. Their toll-free number is 1-800-521-8110

by P.R. Adler

Lights, Camera, Action

Introducing . . .Software Movies for the Atari

Question: What happens when the president of a technical consulting firm buys an Atari 800 for his kids? Answer: He starts thinking about starting a commercial line of children's software for Atari computers.

That's exactly what happened to David Mastran, who heads Maximus, Inc. in McLean, Virginia. What he came up with are high-tech fairy tales he calls "software movies"—computer-generated animated stories complete with narration and original musical scores. The characters talk and the narration is synchronized with lip movements or synched with other face animation.

Mastran has organized his movies into what he calls a "library series concept. With this concept we've made it easier for both the parents and child to keep track of what titles they own or would like to purchase," he explains.

For its debut, Maximus is introducing four packages of movies—SAFETYLINE, STORYLINE, TRAVELINE, AND SCIENCE-LINE. Each package includes two movies, complete with narrated summaries of the stories' morals or rules, and two games per movie which reinforce the story's concept. Children use either the keyboard or a joystick to play the games.

In SAFETYLINE a character named Max the Cat narrates two tales about a little boy named Sam. In "Sam Goes to School," children learn valuable safety tips for crossing streets safely. In "Sam Gets Lost at the Zoo," they learn what to do if they get lost.

STORYLINE includes computerized versions of two fairy tales, narrated by Clover the Clown—"Rumpelstillskin" and "The Ugly Duckling." In "Rumpelstillskin" children learn rules like "never make a promise you can't keep;" In "The Ugly Duckling" they learn to "look for the good in those who are different."

Best of all, you don't have to wait in line for these movies. And adults will enjoy them as much as children do.

Requires Atari computer with 48K RAM program cassette recorder and disk drive. Joystick are optional. Suggested retail price: $39.95 Available now.

For more information, contact Maximus, Inc. 6723 Whittier Ave., McLean, Virginia 22101 or call toll-free (800) 368-2152.

USER GROUPS SPEAK OUT

Dear Atari Explorer,

Two weeks ago I telephoned James Copland at Atari and spoke about a number of matters of concern to our members. I asked, "Will the Atari Connection continue?" and "What is happening to User Group support?" Mr. Copland kindly put us "in the picture" that things were happening for the good.

It is my understanding that the "Connection" is continuing in January, 1985. This is great news—it was becoming extremely popular and every issue was sought after by our members. We hope that it may continue more regularly than quarterly. Our club magazine is being directed to you. Please use any article or listing you wish, providing credit to author/club.

We are glad to hear that User Group support will continue.

Norman V. Pearce
Adelaide Atari Computer Club
Australia

Dear Atari Explorer,

What is Atari going to do with User Group support? We started a group last year and have been very grateful for the items sent to us. We hope it will continue. The best way Atari owners get the most use from their computers is to have a user group in their area to attend regularly.

I'm sending you our last two newsletters. Thank you.

Alan Dock, President
Tri-County Atari User's Group

Dear Atari Explorer,

I belong to two Atari User Groups and would also like to start a new group in my local area. I would appreciate it if you could furnish me with the Users Group Pack so we can establish a new group.

I would also like to offer my services or my son's to write reviews on Atari products and submit them to you.

Robert Taylor
Howell, N.J.

Atari has about the most impressive collection of users in the industry. We want to do all we can to help you. Right now the plans are still being formed, but the Atari Explorer will serve as the focus of our activities for now.

Please keep those newsletters coming. Our staff reads every one. Let us know if we can reprint articles from your newsletter; we like to share good information. Send them to:

Atari Explorer
1265 Borregas Ave.
Sunnyvale, CA 94086
Attn: Neil Harris

We will be publishing updated lists of user groups in upcoming issues.

"I want to set up a BBS."

Dear Atari Explorer,

I live in a remote area where it has been difficult for me to get information about your products and software. I haven't been able to find a local Atari BBS (Electronic Bulletin Board System), so I have decided to start my own. Where do I begin?

My main goal is to be able to use my Atari 800 for work in the day, and have it set up as a BBS in the evening. Any information you can pass along will be very welcome.

Robert Cash Jr.
Amarillo, Texas

You're in luck! One of our contributing editors, Cassie Stahl, will be writing about BBS's in our next issue. Cassie and her husband Bob operate their own Atari FoRem BBS, and she will help you reach out and explore the exciting world of computer telecommunications. Meanwhile, here's some information that will help get your BBS up and running today:

Hardware: At a minimum, you'll need an Atari 800 or 800XL computer; at least one disk drive (two drives are preferable); an auto-answer direct connect modem; and a good printer.

Software: There are a number of good software packages available. You should log onto different BBS's before deciding which one best fits your needs. Here's a run down of the three most popular Atari BBS's:

1) AMIS (Atari Message and Information Service) is a public domain program in many user group libraries. The best source for this program is MACE (Michigan Atari Computer Enthusiasts). You can contact the MACE AMIS BBS by calling either 313-589-0996 or 313-274-3940.
2) ARMUDIC (Derived by substituting the original ARMUDIC BBS phone number into letters - 276-8342) is a very popular Atari BBS program developed at the Downtown Washington Atari Users Group. It is available with documentation for a nominal fee. Contact the Washington DC ARMUDIC BBS at 202-276-8342 for more information.
3) FoRem (Friends of Rick E Moose) is a multifeatured BBS

that is gaining broad acceptance in the world of Atari telecommunications. It was developed by Mat Singer, who sells the program fully documented (by Mrs. Singer) for $80.00. For more information, contact the FoRem RICKY MOOSE BBS at 301-474-7591.

Protect Your Programs

Dear Atari Explorer,

Is there a way to make a code word so other people can't run or list your program? If so, please tell me how.

Robert Hughes
Sacramento, California

The Fall 1983 issue of Atari Connection has a detailed article entitled "Protecting Your Programs" that shows many ways to protect programs and includes a code word program. (Back issues are available through our subscription department) Enter this program and I'll show you how to protect it.

```
10 FOR X=1 TO 50:POKE
   710,X:NEXT X:GOTO 10
```

1. Disable the BREAK key: The first thing you can do to protect this program is to add another line of programming that will disable the BREAK key. Delete "GOTO 10" from this program and add the following line:

```
20 POKE 16,64:POKE
   53774,64:GOTO 10
```

RUN your new program and try to stop it by pressing BREAK. You can't get into it! To be effective, this "BREAK disable" routine must be inserted in your program after each Graphics Mode command.

2. The SYSTEM RESET Foiler: Disabling the BREAK key has its limitations. Someone's going to figure out, real fast, that he or she can break into your program and list it by simply pressing the SYSTEM RESET key. To foil culprits, add this line to your program:

```
5 POKE 580,1
```

When someone presses SYSTEM RESET, the program is purged from the computer's memory -no program, no listing! This "System reset Foiler" routine must be the first line of your program to work properly.

An AUTORUN.SYS

Dear Atari Explorer,

I have been trying unsuccessfully to implement an AUTORUN.SYS file so that a BASIC program will run automatically when I boot the disk. I would greatly appreciate an explanation of the process. I have been unable to find adequate documentation about it.

Daniel A. Aber

The "Bits and Pieces" section of the Fall 1983 issue of Atari Connection contains a program called "AUTORUN.BLD" that lets you create an AUTORUN.SYS file to automatically RUN a program of your choice.

This valuable program is also available from the A.C.E. (Atari Computer Enthusiasts) public domain library. For more information about the A.C.E. user group, read "User Friendly" in this issue.

Handicapped Help

Dear Atari Explorer,

I am interested in obtaining information on how handicapped individuals with the use of one upper limb can more conveniently use the Atari 800 or 800XL computer. We are specifically interested in the use of keys that must be pressed simultaneously, such as the CONTROL and cursor direction movement key(s).

A.B. FOX, Jr.
Principal
Bad Kissinger American Elementary School

Fellow Atari user Greg Menke has developed a program he calls "Function Keys." This program lets you redefine single keys, and allows you to execute control functions with a single keystroke. This program is in the A.C.E. public domain library. For more information see "User Friendly" in this issue.

Mr. Carl Schwartz of Ashtabula, Ohio has also offered his help. Mr. Schwartz's school serves handicapped residents of Ashtabula County, Ohio, providing individual instruction to its students. The children are moderately to severely developmentally disabled. He has computer programs available for preschoolers to about the 6th grade level, and will be happy to supply information about his software and copies of public domain programs. Mr. Schwartz also has information about using the Atari with mentally handicapped students. You can write Mr. Schwartz c/o Ashtabula Co. Bd. of MSPR/DD, 2505 South Ridge East, Ashtabula, Ohio, 44004.

It Doesn't Work!!

Dear Atari Explorer,

I bought an Atari 800XL the other day, dug out the Summer edition of Atari Connection, and typed in a program called "MEMOPAD". Nothing happened! Can you tell me why?

Jack Beebe
Urbana, Illinois

You're right. Nothing happens. Have no fear, here's a simple program, written entirely in BASIC:

```
10 GRAPHICS 0
20 OPEN #1,4,0,"K:"
30 GET #1,A
40 PRINT CHR$(A);
50 GOTO 30
```

QUESTIONS AND ANSWERS FROM ATARI CUSTOMER RELATIONS

Q: "I tried to load an old game on my new Atari 800XL and it wouldn't work. A friend told me that I need a Translator Disk. How do I get one?"

A: The translator disk makes all software written for the older models work for the newer ones. The disk costs $9.95 plus $2.50 for handling, and is available from:

Atari Customer Relations
P.O. Box 61657
Sunnyvale, CA 94088
ATTN: Translator Disk

Q: "I recently purchased a 1050 disk drive. I want to use the enhanced storage capabilities of the new Disk Operating System, DOS 3, but I have a lot of files in the older DOS 2. How can I translate from one to the other?"

A: If you boot your system with DOS 3, you will have no trouble using files made with DOS 2. Simply go to the DOS menu on the DOS 3 master disk and choose the option labeled "Access DOS 2."

Follow the procedures on pages 24 and 25 in the Introduction to the ATARI Disk Operating System, DOS 3 that comes with your unit. You'll need a disk already initialized with the DOS 3 format. The "Access DOS 3" option enables you to copy a DOS 2 formatted file onto your new disk in DOS 3 format.

If you want to go the other way -convert DOS 3 files to DOS 2 format - you have only one option (at the time of this writing). Save your DOS 3 files onto a cassette, turn off the computer, reboot with DOS 2, and save the file.

Q: "I am a new Atari owner and borrowed a book on BASIC from a friend who owns another brand computer. When I type in some of the programs I get error messages, though I'm certain I have made no errors. What's going on here?"

A: All BASICs are different. The form used with many other computers is based on a "dialect" of the language developed by Microsoft Corporation. Atari BASIC differs in a few minor, and one or two major, respects. The best way to get a clear understanding of MicroSoft BASIC is to purchase and become familiar with Atari's version of this language: "Atari MicroSoft BASIC II."

Q: "Most of the books I find for the Atari say they are for the Atari 400 and 800. I own an 800XL. Where can I find literature for my machine?"

A: The BASIC language in the 600XL and 800XL is identical to the BASIC cartridge used in Atari's 800 and 400 models. Therefore, 99% of the material written for the 400 and 800 computer applies to your 800XL. The only exceptions might be books dealing with machine language programming.

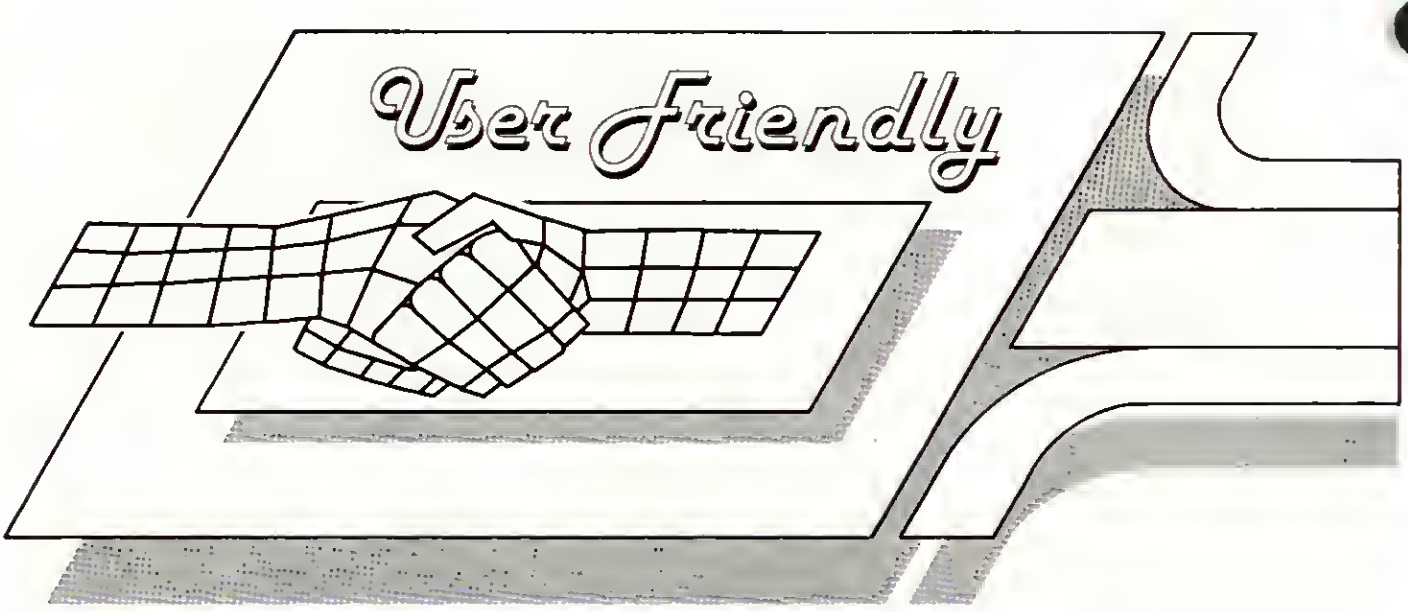
Q: "How can I write a program that can't be listed? You see, I have a younger brother who's a real pain, and. . ."

A: Here is one way to keep those prying eyes away from your listings. But before you use this method, save an uprotected copy of your program. You won't he able to list it after you follow these instructions!

Add the following line to your program. Make sure to use a line number that's higher than any line number in the program you want to protect.

```
32767 POKE PEEK)138 + 256*
PEEK(139) + 2,0:
SAVE "D:FILENAME":NEW
```

When you're ready to active this devastating line,, give it a filename. Then type GOTO 32767 in the immediate mode, and press RETURN. The program is now protected! Trying to do anything other than run the program will result in a fatal case of lock-up. To convert this to a tape-based program, use the command RUN "C:" instead of SAVE "D:FILENAME".



By David and Dorothy Heller

Welcome to **User Friendly.** In this and future columns, we'll bring you interviews and news from the people at Atari Corp. and present in-depth profiles of featured users' groups, complete with ready-to-run program listings that demonstrate each group's main emphasis. At the end of each column in the Q & A Forum, you'll have a chance to ask us questions and see your name in print.

Atari Users' Groups Support You

An Atari Users' group is an organization of Atari computer owners whose main purpose is to share information about Atari-related programs and products, and help each other expand the usefulness and enjoyment of their computing experience.

In this column you'll get a first-hand look at a Featured Atari Users' group. If you don't already belong to a group, we'll show you how to participate in one or more of the hundreds of Atari Users' groups, with thousands of members, around the world. These groups are actively providing valuable support and activities to you, the Atari user. To whet your appetite, here's what a typical group has to offer:

An Atari Users' Group Can Help You:

- Increase your software library, or share your programs with others.
- Find commercial software packages that are just right for your application.
- Find peripherals that work best with your Atari computer, and learn how to connect, and get the most from your new purchase.
- Learn how to program in languages like: BASIC, PILOT, LOGO, C, FORTH, ACTION, or assembly language.
- Enhance your children's computing experience hy introducing them to the fundamentals of Atari computing.
- Get involved in community help projects, and participate in local and regional computer fairs.
- Expand your horizons by entering the world of computer telecommunications.

If these features sound interesting, an Atari Users' group may be one of your most valuable resources for happy and productive computing.

Featured Users' Group
A.C.E.
Atari Computer Enthusiasts
Eugene, Oregon

As the first Atari Users' group, A.C.E.'s history and profile have been chosen to kick-off the **User Friendly** column.

In The Beginning

Mike Dunn's life hasn't been the same since the first shipment of Atari computers arrived in Eugene, Oregon in February 1980. Mike bought the local store's first Atari computer, rushed home, plugged it in, and became Eugene, Oregon's first Atari enthusiast.

It didn't take long for Mike's enthusiasm to spread, despite his busy schedule as a pediatrician, and within a few weeks many of Mike's friends had

ught Atari fever. In those days, documentation was sparse, the manuals were "preliminary," and personal computing was in its infancy. But this didn't daunt Mike and his friends—it brought them closer together.

Events moved swiftly, and in January 1980 twenty local Atari users formally banded together and started A.C.E. to support each other and provide support to others, who like themselves, were learning about this new machine.

Stacey Goff was elected as the group's first president, Mike Dunn became the editor of the A.C.E. newsletter, and the first Atari Users' group was born.

A.C.E. Goes International

A.C.E. went international in August 1980 with the publication of their first newsletter. Mike mailed copies of the newsletter to a number of major computer magazines and got good reviews, and enthusiastic response from Atari users across the nation and around the world.

Now, in addition to its local and domestic membership, A.C.E. boasts members from Germany and Sweden, Great Britain, Canada and South America, and is extremely active in the cities of Melbourne, Perth, and Sidney, Australia.

Their global reach has strengthened the group. Members from the United States and other countries regularly contribute valuable programs to A.C.E.'s large and expanding public domain Software Exchange Program.

Stan Ockers from Lockport, Illinois has been contributing original programs and tutorials to A.C.E. since June 1981, and continues to churn out educational and game programs at the amazing rate of one-per-month. The prolific Mr. Ockers is responsible for "Tiny Text", a multifeatured word processor, "Chicken", an arcade action game, and "Alphahet Train", the arcade type educational game featured in this column.

Other notable contributors include Australian member Sidney Brown, who developed the arcade games "Diamond Mine" and "Pharaoh's Tomb", and Canadian Dale Lutz who writes utilities that help others create sophisticated programs.

Electronic Bulletin Board and Newsletter

The club's electronic bulletin board and newsletter link its members together.

A.C.E.'s twenty-four-hour electronic bulletin board system (BBS) is packed with helpful Atari-related news and information, messages from members around the world, and a wide assortment of valuable public domain software. The BBS, which can be reached by dialing 503-343-4352, has 1.6 megabytes of on-line capacity, supports XMODEM protocol (error checking file transfer), and is being constantly expanded and improved.

The monthly A.C.E. newsletter contains both hardware and software reviews; the latest Atari gossip; articles on education, game writing, and other topics of interest to Atari users; plus original program listings written in BASIC, assembly language, ACTION, PILOT, LOGO and other languages.

The Group's Scope Continues to Grow

The group's scope has grown with its membership. A.C.E. members helped Atari set up a system to provide support to Atari owners; sponsored the first Atari Users' Conference; have been a major beta test site for many of Atari's new products including the 800XL computer and the LOGO and PILOT languages; and have evaluated and tested Atari-related hardware, software, and hooks for many third-party manufacturers and publishers.

Special Interest Groups (SIGs) form the nucleus of A.C.E. In addition to groups that specialize in helping members to learn how to program and use their Atari computers, an educational SIG called E.R.A.C.E. (Educational Researchers of A.C.E.) specializes in evaluating and writing programs and specifications for Atari educational software. Among its other activities, E.R.A.C.E. operates a LOGO language test facility, and works on projects for the handicapped.

BugBusters

Support is what a users' group is all about, and A.C.E.'s new BugBuster program really drives this point home. The program provides telephone hotlines around the country, manned by club volunteers ready to help members solve almost any Atari-related problem. The A.C.E. newsletter lists BugBuster names, phone numbers, and area of expertise in each issue.

Illustrated by SHARON O'NEIL

Our Name Speaks for Itself

The name "Atari Computer Enthusiasts" and its acronym, "A.C.E.", became so popular that the Eugene, Oregon A.C.E. group gave other groups permission to use this name as part of their name. In future columns, we'll profile other Atari Users' groups, some containing the A.C.E. acronym, and others with their own unique name, all providing valuable service to Atari users.

Mike Dunn aptly summed up his group's main focus when he said, "we're the original Atari Computer Enthusiasts. Our name speaks for itself."

Vital Statistics

If you'd like to become an A.C.E. member, receive their newsletter, or participate in their Software Exhange Program . . .

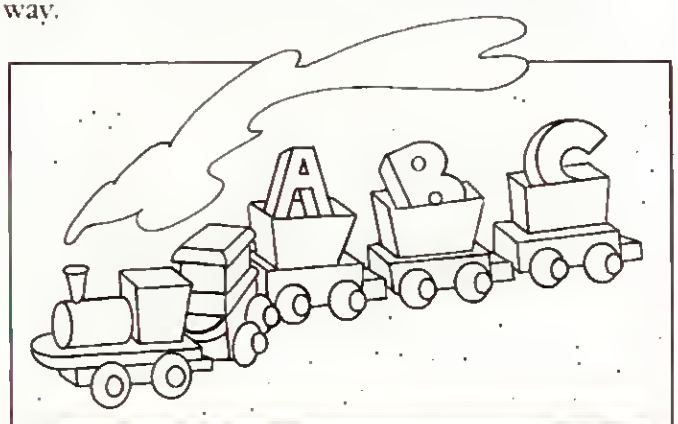
Write:

Atari Computer Enthusiasts
3662 Vine Maple Drive
Eugene, OR 97405
Phone: 503-686-1490

If you've got a modem, and would like to chat with the A.C.E. BBS, call: 503-343-4352

Alphabet Train
An A.C.E. Computer Program
(Joystick required)

Stan Ockers wrote Alphabet Train, and contributed it to the A.C.E. public domain library. This program, written in BASIC, puts your Atari computer's excellent sound and graphics capabilities to full use. It presents word recognition and spelling to toddlers in an interactive, funfilled, action-packed way.



Take the "A" Train

After you run the program, a highlighted word, the alphabet train (a train with boxcars, each containing one letter of the alphabet), a crane, and a dump truck appear on your screen.

You've got to correctly spell the word by using your joystick to position a boxcar under the crane. Once the train is in position, you operate the crane, lift a letter from the boxcar, and put it in the dump truck. After you've placed all the letters that make up the word into the dumptruck, it rumbles off to the word factory, and the game begins again with a new word.

Easy Does It

The program listing is long, so take your time when entering it. Save the program before you run it, just to make sure you haven't made any typing errors.

```
100 REM ****************************
110 REM *     Alphabet Train       *
120 REM *Atari Computer Enthusiasts*
130 REM *    Stan Ockers 1/83      *
140 REM ****************************
142 REM ** DEFINE STRINGS **
148 GRAPHICS 18:POSITION 5,5:? #6;"AlP
hAbEt":POSITION 7,7:? #6;"tRaIn":POSIT
ION 2,10:? #6;"INITIALIZING .."
150 DIM A$(1),SCR$(1),B$(12),TRN1$(180
),TRN2$(180),TRN3$(180),TRK1$(28),TRK2
$(28),TRK3$(28),W$(6)
160 DIM L$(10):L$(10)=CHR$(0):L$(1,1)=
CHR$(0):L$(2)=L$:DIM BL$(10):BL$=L$
170 DIM P$(8):RESTORE 180:FOR J=1 TO 8
:READ A:P$(J,J)=CHR$(A):NEXT J
180 DATA 1,3,7,255,255,7,3,1
190 DIM R$(8):RESTORE 200:FOR J=1 TO 8
:READ A:R$(J,J)=CHR$(A):NEXT J
200 DATA 128,192,224,255,255,224,192,1
28
210 RESTORE 220:FOR J=1 TO 12:READ A:B
$(J,J)=CHR$(A):NEXT J
220 DATA 24,36,66,129,129,129,129,129,
129,129,66,0
230 TRN1$(180)=" ":RESTORE 232:FOR J=1
 TO 24:READ A:TRN1$(J,J)=CHR$(A):NEXT
J:TRN1$(25)=TRN1$
232 DATA 77,84,84,0,84,84,205,212,212,
128,212,212,13,20,20,0,20,20,141,148,1
48,128,148,148
240 TRN2$(180)=" ":RESTORE 242:FOR J=1
 TO 24:READ A:TRN2$(J,J)=CHR$(A):NEXT
J:TRN2$(25)=TRN2$
242 DATA 0,32,32,32,32,32,0,96,96,96,9
6,96,0,160,160,160,160,160,0,224,224,2
24,224,224
250 TRN3$(180)=CHR$(0):TRN3$(1,1)=CHR$
(0):TRN3$(2)=TRN3$:FOR J=10 TO 160 STE
P 6:TRN3$(J,J)=CHR$(J/6+95):NEXT J
260 RESTORE 262:FOR J=1 TO 28:READ A:T
RK1$(J,J)=CHR$(A):NEXT J
262 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,84,84,0,0,0,0,84,84,0,84,0,0,
264 RESTORE 266:FOR J=1 TO 28:READ A:T
```

```
RK2$(J,J)=CHR$(A):NEXT J
266 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,224,224,224,224,224,224,224,21,32,32,
32,32,0,
270 RESTORE 272:FOR J=1 TO 28:READ A:T
RK3$(J,J)=CHR$(A):NEXT J
272 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,32,13,22,0,0,
278 REM ** SET ASIDE PM AREA **
280 GRAPHICS 7:POKE 106,PEEK(106)-5:PM
=PEEK(106)+1:POKE 54279,PM:GRAPHICS 18
:GOSUB 910
290 RESTORE 300:FOR J=704 TO 712:READ
A:POKE J,A:NEXT J
300 DATA 32,255,18,82,50,255,34,52,57
310 POSITION 5,1:? #6;CHR$(142);CHR$(1
42);CHR$(142):POSITION 6,6:? #6;"-----
---------"
320 POSITION 0,10:FOR I=1 TO 20:? #6;C
HR$(171);:NEXT I
330 POKE 559,46:POKE 53277,3
340 REM ** MAP A$ ONTO PM AREA **
350 VVTP=PEEK(134)+PEEK(135)*256:STARP
=ADR(A$)
380 OFFS=PM*256+512-STARP:HI=INT(OFFS/
256):LO=OFFS-HI*256
390 POKE VVTP+2,LO:POKE VVTP+3,HI:POKE
 VVTP+5,2:POKE VVTP+6,0:POKE VVTP+7,2
392 REM ** MAP SCR$ ONTO SCREEN AREA *
*
400 SCR=PEEK(88)+256*PEEK(89):OFFS=SCR
-STARP:HI=INT(OFFS/256):LO=OFFS-HI*256
420 POKE VVTP+10,LO:POKE VVTP+11,HI
430 POKE VVTP+12,5:POKE VVTP+13,1:POKE
 VVTP+14,5:POKE VVTP+15,1
440 Y=60:Z=80:X=50
450 A$(Y,Y+11)=B$:POKE 53248,Z:FOR J=1
 TO 59:A$(J,J)=CHR$(24):NEXT J
460 A$(280,287)=P$:XP=64:POKE 53250,XP
470 A$(408,415)=R$:XR=158:POKE 53251,X
R
478 REM ** TRUCK COMES IN FROM RIGHT *
*
480 FOR J=1 TO 15:XT=J:GOSUB 1050:SOUN
D 0,100,4,XT/2:FOR K=1 TO 20:NEXT K:NE
XT J:POKE 77,0
488 REM ** PRINT WORD **
490 GOSUB 1010:POSITION 10-LEN(W$)/2,1
1:? #6;W$
498 REM ** LOOP TO MOVE TRAIN **
500 S=STICK(0):IF S=7 AND X>6 THEN X=X
-1:DIR=-1
510 IF S=11 AND X<156 THEN X=X+1:DIR=1
520 IF S<15 THEN 560
530 IF INT(X/6)=X/6 THEN 560
540 IF DIR=-1 THEN X=X-1
550 IF DIR=1 THEN X=X+1
558 REM ** MOVE TRAIN **
560 SCR$(181,200)=TRN1$(X,X+19)
570 SCR$(161,180)=TRN2$(X,X+19)
578 REM ** SOUND IF TRAIN MOVING **
580 SCR$(141,160)=TRN3$(X,X+19)
590 IF X=SX THEN SOUND 0,0,0,0
600 IF X<>SX THEN SOUND 0,100,4,6:SX=X
610 IF STRIG(0)=1 THEN 500
618 REM ** PICK UP LETTER **
620 C=ASC(TRN3$(X+4)):IF C=0 THEN 500
630 FOR J=1 TO 11:Y=Y+1:A$(Y,Y+11)=B$:
SOUND 0,(Y+100)*(Y/3=INT(Y/3)),10,6:FO
R K=1 TO 20:NEXT K:NEXT J
640 CS=57344+256+8*X/6:FOR J=1 TO 8:L$
(J+1,J+1)=CHR$(PEEK(CS+J-1)):NEXT J
650 A$(129+Y,139+Y)=L$:POKE 53249,Z
660 P=4+X:TRN3$(P,P)=CHR$(0):SCR$(141,
160)=TRN3$(X,X+19)
670 FOR J=1 TO 50:Y=Y-1:A$(Y,Y+11)=B$:
A$(129+Y,139+Y)=L$:SOUND 0,(Y+100)*(Y/
3=INT(Y/3)),10,6:FOR K=1 TO 10
680 NEXT K:NEXT J:SOUND 0,0,0,0:FOR J=
1 TO 8:XP=XP+1:POKE 53250,XP:NEXT J
688 REM ** IF LETTER NOT CORRECT DROP
IT **
690 IF C-32<>ASC(W$(LTR+1)) THEN GOSUB
 820
700 FOR J=1 TO 32+8*LTR:Z=Z+1:XP=XP+1:
POKE 53250,XP:POKE 53249,Z
710 SOUND 0,Y+100*(XP/3=INT(XP/3)),10,
6:NEXT J:LTR=LTR+1
720 FOR J=1 TO 15:Y=Y+1:A$(129+Y,139+Y
)=L$:SOUND 0,Y+100,10,6:NEXT J:A$(129+
Y,139+Y)=BL$
730 P=16+LTR:TRK3$(P,P)=CHR$(X/6+96):S
```

```
CR$(67,80)=TRK3$(XT,XT+13):POSITION (Z
-48)/8,1:? #6;CHR$(142)
740 FOR J=1 TO 30:SOUND 0,100+100*RND(
0),8,(30-J)/3:NEXT J
750 XP=XP-1:POKE 53250,XP:SOUND 0,Y+10
0*(XP/3=INT(XP/3)),10,6:IF XP>64 THEN
750
760 Z=80:POKE 53249,Z:Y=Y-15
770 FOR J=1 TO 39:Y=Y+1:A$(Y,Y+11)=B$:
SOUND 0,Y+100,10,6:NEXT J
780 SOUND 0,0,0,0:IF LTR<LEN(W$) THEN
500
788 REM ** WORD CORRECT - MOVE TRUCK O
UT **
790 FOR J=15 TO 1 STEP -1:XT=J:GOSUB 1
050:SOUND 0,100,4,XT/2:FOR K=1 TO 20:N
EXT K:NEXT J
795 GOSUB 2040
800 POSITION 7,11:? #6;"       ":FOR J=
10 TO 160 STEP 6:TRN3$(J,J)=CHR$(J/6+9
5):NEXT J
810 LTR=0:FOR J=17 TO 22:TRK3$(J,J)=CH
R$(0):NEXT J:POSITION 8,1:? #6;"
":GOTO 480
818 REM ** ROUTINE FOR PUTTING INCORRE
CT LETTER BACK **
820 FOR J=1 TO 14:SOUND 0,50+50*(XP/3=
INT(XP/3)),10,6
830 Z=Z+1:XP=XP+1:XR=XR-4:POKE 53249,Z
:POKE 53250,XP:POKE 53251,XR:NEXT J:SO
UND 0,0,0,0
840 FOR J=1 TO 14:Z=Z-1:XP=XP-1:XR=XR-
1:POKE 53249,Z:POKE 53250,XP:POKE 5325
1,XR:NEXT J
850 FOR J=1 TO 8:XP=XP-1:XR=XR+2:POKE
53250,XP:POKE 53251,XR:Y=Y+1:A$(129+Y,
139+Y)=L$:A$(Y,Y+11)=B$:NEXT J
860 FOR J=1 TO 27:XR=XR+2:POKE 53251,X
R:Y=Y+1:A$(129+Y,139+Y)=L$:A$(Y,Y+11)=
B$:SOUND 0,Y+100,10,8:NEXT J
870 FOR J=1 TO 15:SOUND 0,Y+100,10,8:Y
=Y+1:A$(Y,Y+11)=B$:A$(129+Y,139+Y)=L$:
NEXT J:TRN3$(P,P)=CHR$(C)
880 FOR J=1 TO 30:SOUND 0,100+100*RND(
0),8,(30-J)/3:NEXT J
890 SCR$(141,160)=TRN3$(X,X+19):A$(129
+Y,139+Y)=BL$:FOR J=1 TO 11:Y=Y-1:A$(Y
,Y+11)=B$:NEXT J
900 SOUND 0,0,0,0:GOTO 500
908 REM ** MACHINE LEVEL - MOVE CHARAC
TER SET **
910 POKE 756,PM
920 DIM MV$(23):RESTORE 930:FOR J=1 TO
 23:READ A:MV$(J,J)=CHR$(A):NEXT J
930 DATA 104,104,133,204,104,133,203,1
04,133,206,104,133,205,160,0,177,203,1
45,205,136,208,249,96
940 CS=57344+512:NCS=PM*256:A=USR(ADR(
MV$),CS,NCS)
950 FOR J=NCS TO NCS+7:POKE J,0:NEXT J
```


```
920 DIM MV$(23):RESTORE 930:FOR J=1 TO
 23:READ A:MV$(J,J)=CHR$(A):NEXT J
930 DATA 104,104,133,204,104,133,203,1
04,133,206,104,133,205,160,0,177,203,1
45,205,136,208,249,96
940 CS=57344+512:NCS=PM*256:A=USR(ADR(
MV$),CS,NCS)
950 FOR J=NCS TO NCS+7:POKE J,0:NEXT J
```


```
960 CS=57344+256:NCS=PM*256+256:A=USR(
ADR(MV$),CS,NCS)
970 FOR J=NCS TO NCS+7:POKE J,255:NEXT
 J
980 NCS=PM*256:RESTORE 990:FOR J=160 T
O 167:READ A:POKE NCS+J,A:NEXT J
990 DATA 0,0,60,102,219,219,102,60
1000 POKE 756,PM:RETURN
1008 REM ** PICK A WORD SUBROUTINE **
1010 RESTORE 1020:FOR J=1 TO INT(RND(0
)*10)+1:READ W$:NEXT J:RETURN
1020 DATA DOG,CAT,BIRD,HAND,COW,HORSE,
PET,FROG,FLY,ARM
1030 DATA HAIR,TOE,FINGER,LEG,FACE,EAR
,MOUTH,BAT,WORK,PLAY
1040 DATA WAGON,BIKE,MILK,WATER,JUICE,
BREAD,ANT,GOAT,GHOST,FLAT
1048 REM ** PRINT TRUCK SUBROUTINE **
```

```
1050 SCR$(107,120)=TRK1$(XT,XT+13):SCR
$(87,100)=TRK2$(XT,XT+13):SCR$(67,80)=
TRK3$(XT,XT+13):RETURN
2030 REM ** TUNE SUBROUTINE **
2032 DATA 91,6,121,1,91,2,121,1,91,2,8
1,1,72,8,91,8,68,6,68,1,91,4,81,4,72,8
,0,4
2034 DATA 91,6,121,1,91,2,121,1,91,2,8
1,1,72,8,91,4,72,2,72,1,72,4,81,4,81,4
,72,4,81,8
2040 RESTORE 2032:FOR J=1 TO 29:READ P
,T:IF P=0 THEN FOR K=1 TO 20*T:NEXT K:
GOTO 2070
2050 SOUND 0,P,10,8:SOUND 1,2*P,10,6:F
OR L=1 TO 12*T
2060 NEXT L:SOUND 0,0,0,0:SOUND 1,0,0,
0
2070 NEXT J:RETURN
```

We Need Questions!

In future columns we'll be answering YOUR questions. But, we need questions to answer!

So, if you've got a question about user groups, Atari Corporation's direction and support, or if you've got a compliment, or a gripe, please write us. Remember, without you there cannot be a Q & A section!

The Next Featured Users' Group?

We haven't yet chosen the next Featured Users' Group. If you would like your group featured, just write us a short letter telling us about your group, and why you feel our readers would be interested in reading about it.

No Group Too Small

Size is not a criterion.We are not necessarily looking for big users groups. We want to feature groups that are providing unique and interesting services to their members.

We don't have much time to make our choice, so write us today!

User Friendly
c/o Atari Explorer
1265 Borregas Ave.
Sunnyvale, CA 94088

Dorothy and David Heller are the coauthors of numerous Atari-related books including Free Software for your Atari, (Enrich/Ohaus Publishers) which focuses on Atari Users' Groups and computer telecommunications.

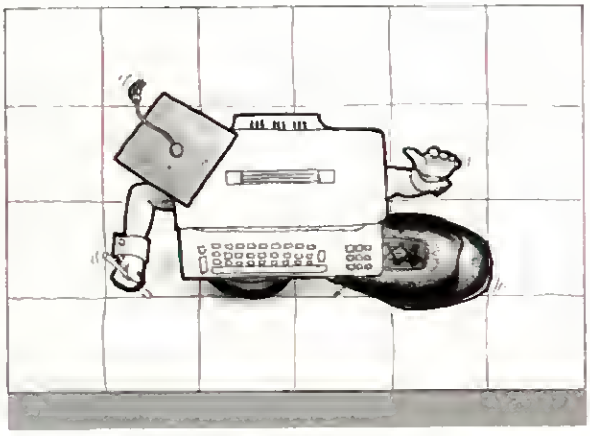
Welcome to the world of educational computing! In the coming months, parents, educators, writers, industry analysts, software developers and yes, kids too, will be sharing their thoughts and ideas on educational issues. We'll swap experiences and offer reviews of the newest and best educational software on the market. We'll discuss teaching strategies and explore the issues that confront parents and teachers in the '80s. We'll suggest books and events that will help make your educational experiences richer and more diverse. Best of all, we'll offer a variety of insights and helpful hints to help you get the best educational value from your Atari computer.

In future issues, this section will be broken down into separate compartments so that you, the reader, will have quick access to the information you need. If there are issues you'd like to hear about, if you have questions or experiences you'd like to share—let us know. We value your input and look forward to hearing from you.

Illustrated by STAN ZARUBIN

EDUCATIONAL COMPUTING

- - - An Overview



by Ute Elisabeth Van Nuys

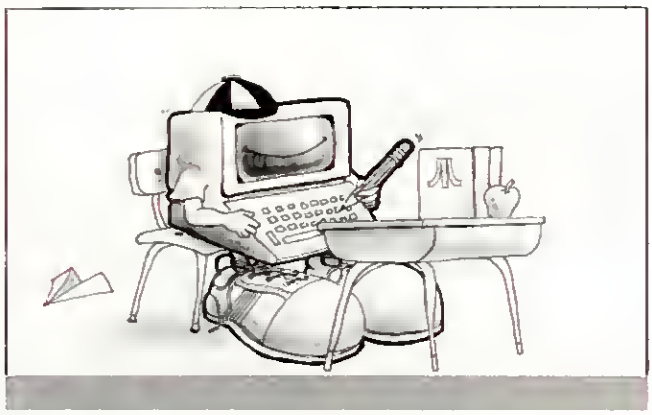
The era of the personal computer is here and everyone, it seems, is jumping on the bandwagon. Parents and teachers are no exception. Interest in using computers for educational applications is growing tremendously. School districts are vying with one another to set up computer labs, to promote "computer literacy" among teachers, and to assure anxious parents that their children will be prepared for whatever the future will bring. Parents, for their part, often cite education as one of the chief reasons behind their purchase of a home computer. Whether the concern is helping youngsters to improve basic skills through drill and practice, to enhance critical thinking and problem-solving skills, or to pick up computing expertise that may lead to future job options, many parents as well as teachers are sold on the importance of computer education. The excitement is almost palpable. No one wants to be left behind.

It's difficult to remember that there was a time, not so terribly long ago, when whole days, weeks, even years could go by with hardly a mention of computers. All that has changed. Change is the name of the game and computers are ushering in many changes, both societal and personal.

Forty years ago, computers were huge, cumbersome, numher crunchers, totally unsuited to the needs of the average individual. While the machines themselves became smaller, faster, and more versatile, their use was still limited to large corporations which had the space and financial resources to cope with these cabinet-sized wonders. The real "computer revolution" hegan with the arrival of the personal computer. Small, powerful, versatile, and relatively affordable, these desk-top models have brought the power of electronic computing within the reach of the individual and their use is expanding rapidly.

Business, science, education, sports, art, music—even farming—it's hard to think of an area that remains untouched hy computers. Computers are changing the way we work, the way we play, and way we learn. Everyone has a stake in the future and computers are clearly a part of that future. Little wonder then that parents and educators should look for ways to prepare children and young people to take an active and productive role in the computerized world of tomorrow.

As we move toward an information-based society, we have an opportunity and an obligation to introduce children to the technology of the future. The obvious way to do that is to bring computers into our classrooms and homes. But having a computer is only the first step. It's not a magic wand that guarantees educational excellence or confers a special advantage. The computer is a tool with great potential, but that potential can only be realized through intelligent use. And that brings us to the most important variable in the student/computer relationship. All the equipment and software in the world are useless—if they're not used. A school district can mandate computers in every classroom, but interest in using them is not so easily mandated.



Parents can buy the best educational programs available, but those programs won't teach a child anything unless the child is willing to learn. Motivating youngsters to really use the computer, seeing to it that their experiences are valuable and rewarding, providing them with the right tools, at the right time, that's the real challenge.

Only a year ago, "computer literacy" was the hottest slogan around. But it's already yesterday's slogan. Today's questions are: What do we mean by computer literacy? What kinds of computer exposure should kids have, and why? Does "computer literacy" mean using computers to hone skills learned in school? Does it mean learning to operate a computer and boot a simple program? Does it mean learning to write programs from scratch? If so, in which languages, and why? Does it mean learning to understand and use word-processing, spread-sheets, graphics packages, and all the other applications kids are likely to encounter out in the real world? What is computer literacy, exactly, and who gets it? Who doesn't and what are the reasons? What should our children be learning about computers and their effects on individuals and on society?

There aren't any simple answers. There is still a lot that has to be figured out. But asking the right questions will speed the process along and may, eventually, lead us in the right direction—and education may never be the same.

Computers in the School

Our system of public education is huge and it's tempting to think that anything so large and established would have difficulty in responding to and incorporating rapid change. The schools' reaction to computers proves otherwise. Many educators are excited by the potential advantages of this new tool and they've gone all out in an effort to get computers into the classroom and into the hands of students. They've had impressive results, but they also face some impressive problems.

To an outsider, the job may appear easy. You just buy a hunch of computers, throw in a reasonably knowledgeable teacher, add a lot of students and—bingo—you have computer literacy for all. Well, it isn't that simple. First, there's the problem of financing. All those computers cost money and the machines themselves are only the tip of the iceberg. Programs for those computers can easily double and triple the original cost of the hardware. Then there are maintenance and repair costs.

Next there is the question of teacher training. Who will run those machines? Obviously, it should be someone who knows how to use them. Beyond that, it ought to be someone with a clear grasp of the school's goals and of the constantly changing technology as well. Someone who gets along well with his or her fellow teachers. Someone who isn't on a personal power trip, because the dangers are there. Whoever controls the computers wields a lot of power and that power can be abused. Interesting political battles result when one teacher turns the computer lab into a private fiefdom, with other teachers playing the role of vassal, begging computer time for their classes.

Then there are the students. What do they get out of all this? The answer may be everything or

nothing. It depends on the kind of long-range planning that's going on. The goals that a school or district sets and the way it goes about implementing those goals, will decide what, if anything, any particular student will get from having those computers around.

As a whole, the educational community has done a remarkable job in responding to the pressures placed on it. Computers are becoming fixtures in more and more schools. Teachers are being trained in ever-increasing numbers and more students are being exposed to at least some aspect of computer usage. But is it enough? Is it good? What is the best use for a school computer?

Computers in the Home

Education is one of the chief reasons for the popularity of the home computer. Parents have been quick to recognize the educational potential of the computer and to want its benefits for their children. While increasing use of computers in the schools indicates that most children will encounter computers at some time during their school years, those who own their own computers enjoy some special advantages.

First, having a computer at home guarantees access. Children don't have to wait in line to use a computer and their time at the computer can be longer.

Next, software can be chosen to suit the individual child's interests and abilities. Individualizing instruction to meet the exact requirements of every student is an educator's dream. In the home, judicious selection of software can make that dream a reality.

Children can learn at their own pace in the comfort of their own homes. They can set their own course of study or just investigate the many other applications of a home computer. They can use the computer to brush up on school subjects or to do homework assignments. They have the option of going over something again and again until it's mastered, or to jump over concepts they already understand.

In spite of these advantages, parents are faced with some legitimate questions.

- At what age can children really use a computer?
- What do you look for in educational software?
- What are the best programs available?
- How do you motivate children to learn?
- Is it important to have the same computer and software that the school uses?
- What should children be learning about computers?
- What kinds of rules do you establish for use?
- Are games effective learning tools?

As computers enter our homes and classrooms, they're bound to change our lives and our society. The Atari computer and the **Atari Explorer** will be part of that change—offering an exciting challenge to take full advantage of using the computer to extend the possibilities of education, both in the home and in the classroom. In the coming months, we will explore the relationship between the computer and learning and, in the process, extend our own knowledge and the capabilities of our own minds. Having the computer is exciting, but using it intelligently is the real challenge.

THE ART OF COMPUTER GAME DESIGN

By
Chris Crawford

All artists develop their own special techniques for the execution of their art. The painter worries about brush strokes, mixing paint, and texture. The musical composer learns techniques of orchestration, timing, and counterpoint. The game designer also acquires a variety of specialized skills, techniques, and ideals. Technique is part of an artists' signature—you must establish and develop your own.

Balancing Solitaire Games

A solitaire game pits the human player against the computer. The computer and the human being are very different creatures. Human thought processes are diffuse, associative, and integrative; machine processes are direct, linear, and arithmetic. This creates a problem. A computer game is created for the benefit of the human player and is cast in the intellectual territory of the player, not of the computer. This places the computer at a disadvantage. Although the computer could easily defeat a person in a game involving computation or sorting, such games would be of little interest to the human player. How do we design the game to challenge the human being? Four techniques are available: vast resources, artificial smarts, limited information, and pace.

Vast Resources

This is by far the most frequently used technique for balancing a game. The computer is provided with immense material resources that it uses stupidly. These resources may consist of large numbers of opponents that operate with rudimentary intelligence. Many play games use this ploy: SPACE INVADERS, MISSILE COMMAND, ASTEROIDS, CENTIPEDE, and TEMPEST. It is also possible to equip the computer with a small number of opponents that are more powerful than the human player's units, such as the supertanks in BATTLEZONE. The effect in both cases is the same: the human player's advantage in intelligence is offset by the computer's material advantage.

This approach has two benefits. First, it gives the conflict between the player and the computer a David-and-Goliath aspect. Most people would rather win as apparent underdog than as equal. Second, this approach is the easiest to implement. Providing artificial intelligence for the computer's players can be difficult, but repeating a process for many computer players requires little more than a simple programming loop. Of course, the ease of implementing this solution carries a disadvantage: everybody does it. Laziness and lack of determination account more for the prevalence of this technique than do game design considerations.

Artificial Smarts

The alternative to the use of sheer numbers is to provide the computer (as player) with intelligence adequate to meet the human player on equal terms. Unfortunately, artificial intelligence techniques are not sufficiently developed to be useful here. Tree-searching techniques have advanced far enough to allow us to produce fair chess, checkers, and Othello players. Any game that can be expressed in tree-searching terms can be handled with these techniques. Unfortunately, very few games are appropriate for this treatment.

An alternative is to develop special intelligence routines for each game. Since such routines are too primitive to be referred to as "artificial intelligence," I use the term "artificial smarts." This is the method I have used in TANKTICS, EASTERN FRONT 1941, and LEGIONNAIRE, with varying degrees of success. This strategy demands great effort from the game designer, for such special routines must be reasonable yet unpredictable.

The apparent contradiction can be resolved through a deeper understanding of the nature of interaction in a game. First, reaction to an opponent is in some ways a reflection of that opponent. A reasonable player tries to anticipate an opponent's moves by assessing the opponent's personality. Second, interactiveness is a mutual reaction—both players attempt to anticipate each other's moves. Third, this interactiveness is itself a measure of "gaminess."

Unfortunately, a perfectly interactive game is beyond the scope of microcomputers, for if the computer is to anticipate human moves interactively, it must be able to assess the personality of its opponent—a hopeless task, as yet. For the moment, we must rely on more primitive guidelines. For example my experience has been that algorithms are most predictable when they are "particular." By "particular" I mean that they place an emphasis on single elements of the overall game pattern. For example, in war games, algorithms like "determine the closest enemy unit and fire at it" are particular and yield predictable behavior.

But I have found that the best algorithms treat the greatest amount of information in the broadest context. That is, they factor into their decision-making the largest number of considerations rather than focus on a small number of particular elements. To continue with the earlier example, a better algorithm might be "determine the enemy unit posing the greatest combination of threat and vulnerability (based on range, activity, facing, range to other friendly units, cover, and sighting); fire on unit if probability of kill exceeds probability of being killed."

Limited Information

Another way to compensate for the computer's lack of intelligence is to limit the amount of information available to the human player. Without the information to process, the human player cannot apply superior processing power to the problem. This technique should not be used excessively, for this reduces the game to a game of chance. It can, nevertheless, equalize the odds. If the information is withheld in a reasonable context (the player must send out scouts), the restriction on information seems natural.

Limited information provides a bonus: it can tease the player's imagination by suggestion without actually confirming. This only happens when the limitations on the information are artfully chosen. Random gaps in information are confusing and frustrating rather than tantalizing.

Pace

Another way to even the balance between human and computer is through the pace of the game. A player may be smart, but the computer is much faster at performing simple computations. If the pace is fast enough, the human player will not have enough time to apply superior processing skills. This is an easy technique to apply, so it comes as no surprise that it is heavily used by designers of skill-and-action games.

I do not encourage the use of pace as an equalizing agent. Increasing pace only succeeds by depriving the human player of the time needed to invest more imagination in the game. Without that investment, the game can never offer a rich interaction. Pace does for computer games what the one-night stand does for romance.

These four techniques for balancing computer games are never used in isolation. Every game uses some combination of the four. Most games rely primarily on pace and quantity for balance with very little intelligence or limited information. There is no reason why a game could not use all four techniques. Indeed, this should make the game all the more successful, for by using elements from each method, the game would not have to strain the limitations of each. The designer must decide upon an appropriate balance for the goals of the particular game.

Relationships Between Opponents

Every game establishes a relationship between opponents that each player strives to exploit to maximum advantage. The form of this relationship defines the interactions available to the players and sets the tone.

The simplest architecture establishes a symmetric relationship between the two players, granting each the same strengths and weakness. Symmetric games offer the obviously desirable feature of being automatically balanced. They tend to be much easier to program because the same process can be applied to each player.

Symmetric games suffer from a variety of weaknesses, the greatest of which is their relative simplicity. Any strategy that seems effective can and will be used by both sides simultaneously. In such a case, success results not from planning but from execution. The game turns on very fine details; chess provides an example—an advantage of but a single pawn can lead to victory.

Because of the weakness of symmetric games, many games attempt to establish an asymmetric relationship between opponents. Each player has a unique combination of advantages and disadvantages which the game designer must somehow balance so that both sides have the same likelihood of victory, given equal levels of skill.

Almost all solitaire computer games use an asymmetric relationship between the computer player and the human player because the computer cannot compete with human intelligence. The human player is given resources that allow her to bring her superior planning power to bear, and the computer gets resources that compensate for its inferior intelligence.

Triangularity

The advantage of asymmetry is that it allows the game designer to build nontransitive or triangular relationships into the game. Nontransitivity is a well-defined mathematical property. In the context of games, it is best illustrated by the rock-scissors-paper game. Two players play the game; each secretly selects one of the three pieces; they simultaneously announce and compare their choices. If both made the same choice, the result is a draw and the game is repeated. If they make different choices, then rock breaks scissors, scissors cut paper, and paper en-

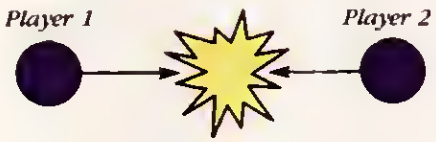
olds rock. This relationship, in which each component can defeat one other and can be defeated by one other, is a nontransitive relationship. That rock beats scissors and scissors beat paper does not mean the rock beats paper.

A simple example of a triangular relationship can be found in the game BATTLEZONE. When a saucer appears, the player can pursue the saucer instead of chasing an enemy tank. In such a case, there are three components: player, saucer, and enemy tank. The player pursues the saucer (side one of the triangle) and allows the enemy tank to pursue him unmolested (side two). The third side of the triangle (saucer to enemy tank) is not important to the human player—the computer maneuvers the saucer to entice the player into a poor position. This example is easy to understand because the triangularity assumes a spatial form within the game as well as a structural one.

Actors and Indirect Relationships

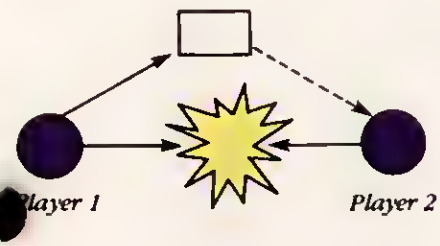
Indirection is the essential element triangularity provides in game design. Indirection is itself an important element to consider, and triangularity is only the most rudimentary expression of it. We can extend the concept of indirection further.

Most games provide a direct relationship between opponents, as shown in the following diagram:

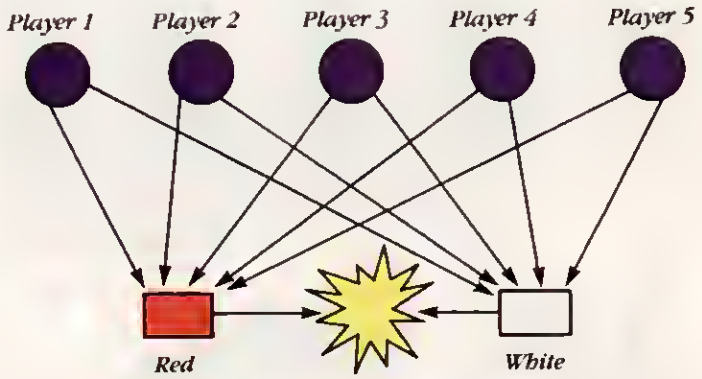


Since the opponent is the only obstacle facing the player, the simplest and most obvious resolution of the conflict is to destroy the opponent. This is why so many direct games are violent.

Triangularity, however, provides some indirection:



Using triangularity, each opponent can encounter the other through the third party. The third party can be a passive agent, a weakly active one, or a full-fledged player. However, it's difficult getting two people together for a game; therefore the third agent is often played by a computer-generated actor. An actor is not the same as an opponent. An actor follows a simple script. It has no guiding intelligence or purpose of its own. For example, the saucer in BATTLEZONE is an actor. Its function is distraction. Its script calls for it to draft around the battlefield without actively participating in the battle.

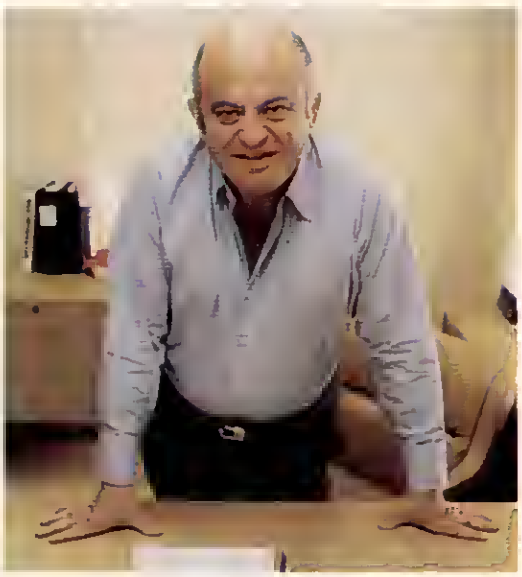


The actor concept allows us to understand a higher level of indirection. In this arrangement, the players do not battle each other directly, they control actors who engage in direct conflict. A good example of this scheme is shown in the game ROBOTWAR by Musu Software. In this game, each player controls a killer robot. The player writes a detailed script (a short program) for her robot. This script is used by the robot in a gladiotorial contest. The game thus removes the players from direct conflict and substitutes robot-actors as combatants. Each player is clearly identified with her own robot. But this form of indirection is unsuccessful because the conflict itself remains direct. Moreover, the player is removed from the conflict and forced to sit on the sidelines.

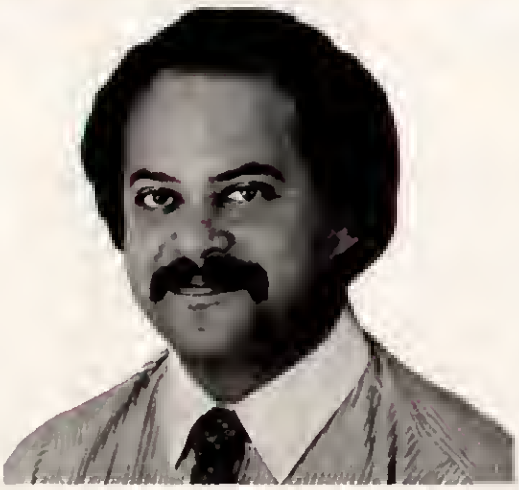
The highest level of indirection I have seen is Dunnigan's RUSSIAN CIVIL WAR game. This board game concerns the civil war between the Reds and the Whites. Dunnigan's brilliant approach is to dissolve completely any identification between player and combatant. Each player receives some Red armies and some White armies. During the course of the game, a player uses his Red armies to attack and destroy other player's White armies. He also uses his White armies to destroy other players' Red armies. The end of the game comes when one side, Red or White, is annihilated. The winner is then the player most identifiable with the victorious army (with the largest number of loser's casualties and the smallest number of winner's casualties).

The indirection in this game is truly impressive. The combatants are in no way identifiable with any individual player until very late in the game. They are actors; Red and White battle without human qualities even though they are played by human players. There is only one limitation to this design: the system requires more than two players to work effectively. Nevertheless, such highly indirect player-to-player architectures provide many many fascinating opportunities; but can only be applied to direct conflicts such as war, which tend to be violent and destructive. For this reason, society discourages direct conflict. Yet conflict remains in our lives, taking more subtle and indirect forms. We fight our real-world battles with smiles, distant allies, pressure, and cooperation. Games with direct player-to-player relationships cannot hope to address most examples of real human interaction. Only indirect games offer any possibility of successfully exploring the human condition.

The Atari Commitment



Jack Tramiel



Sam Tramiel, President, Atari Corp.

It all dates back more than 25 years ago to Toronto Canada, where in 1958, a young man with a dream, a lot of guts and a vision...started a typewriter sales and repair shop. This start up, makeshift company was named Commodore Business Machines, Limited.

"Never settle for doing things the way they were done in the past, always find new ways to do things better, less expensively and more efficiently. Our customers are mature and intelligent people; we must give them the best for their hard earned money because if we don't, they will know we've cheated them".

Applying this work ethic every day of his life, Tramiel set in force aggressive plans that many thought too ambitious and unattainable. Twenty-five years later Tramiel had successfully manufactured and marketed reliable and affordable typewriters, radios, adding machines, thermostats, office furniture, electronic calculators and personal computers through major retail outlets in over 38 countries around the world.

On January 2, 1984, after masterminding the growth of a mere typewriter repair shop in 1958, into the leading microcomputer sales and marketing organization in the world; with gross sales of over one billion dollars annually, Mr. Jack Tramiel resigned his position as President and founder of this same company, now known as Commodore International Limited.

At age 55, having accumulated vast personal wealth, a track record second to none, and when most men are considering retirement, Jack Tramiel made the biggest decision of his career. Convinced there was still a better way to do it and dissatisfied with the dull and technically unadvancing personal computer industry since his departure, Jack Tramiel, on July 2, 1984, made public his decision to purchase the personal computer and video game divisions of the financially troubled Atari Inc., a division of Warner Communications Inc.

The new Atari Corporation is comprised of a small group of hand-picked, seasoned professionals. All are well known in the industry and have a proven track record. All are hands on, fiercely competitive, profit oriented working managers.

The finely tuned machine under the leadership of a 26 year veteran of the trade, will turn this new company into a billion dollar winner. A turnaround that will resemble the closest thing this country has seen since Lee Iacocca led the turnaround of Chrysler.

For the more than 21 million purchasers around the world of Atari personal computers and videogame products, your original decision to purchase was the right one. You are now also a part of this exciting new movement. The new Atari will stretch the outer limits of technology, and take you, our customer, into another generation of advanced technology and communications...all at affordable rock bottom prices.

The People of the New Atari

Leonard Tramiel, Vice-President, Software Development:
"Our job is to produce the best machine for the lowest possible price. We are in business to make money, and we feel that the best way to achieve this is to make a fair — not huge — profit on every item, and sell large volume. At the price, the 65XE is a perfect entry-level computer that is capable of more advanced tasks than most entry-level computers. The hardware design of the 130ST is an extremely elegant application of state-of-the-art logic design, stressing simplicity and speed. The result is a very powerful but low-cost computer."


Leonard Tramiel

James L. Copland, Vice President, Marketing, Atari (U.S.) Corp.:
"The philosophy of the new Atari Corporation is one that has been the cornerstone of Jack Tramiel's success for the past 25 years; think of your customer — then build a full-featured and reliable product to suit their needs, price it right and the consumer will buy it. It's time someone within the industry gave the consumers of the world a price/performance alternative, to high prices, and that's our job. In 1985, Atari will push the outer limits of technology and offer you, the consumer, full-featured, reliable personal computers; all at rock bottom prices."


James L. Copland

David Harris Vice President, International Sales
"We are an international, mass-merchandising company. Our job is to sell volume—that's the only way we can sell at the prices that we do. We have a product line available to the mass market that's never been available at those price levels before. We feel consumers deserve a fair break; after all, they're laying out their hard-earned money."

Gregory A. Pratt, President, Atari (U.S.) Corp.:
"We offer a new choice: the promise of a strong new competitor in the arena, which helps the industry as well as the consumer. The management team now in place has a proven track record as the undisputed champions in the personal computer industry. This talent is dedicated to provide the maximum value to the consumer for less. We will adhere to our simple approach to technology, manufacturing, and marketing. We offer the latest in semiconductor design and systems architecture to minimize the unit cost of our products. Coupled with our volume commitments and tough negotiating posture, we further reduce the cost of our products through economies of scale. The final step is to get the product to market through efficient channels, assuring the pass-through of cost savings to the customer. The plan is simple, tried, and achievable. It requires boldness, commitment, and hard work."


Gregory A. Pratt

Tom Brightman, Vice President of Engineering:
"The thing that's most exciting to me at the new Atari is the way in which technology is being defined to produce a very inexpensive, but very high performance product. You have to correctly position all the components of a product in relation to mainstream technology—it's a balancing act."


Tom Brightman

Joe Spiteri, Vice President, Manufacturing:
"I've learned from Jack Tramiel that nothing *is impossible. One of the things you hear from Jack is: 'What do you mean you can't do it? Of course you can!'"*


Joe Spiteri

The New 8-Bit Products

The Atari XE Series

Atari's 8-bit computer family for 1985 consists of the new 65XE and 130XE. 100% compatible with previous generations of ATARI computers (the 400/800, 1200XL, 600/800XL), there are new features, product improvements, and manufacturing cost reductions highlighting these new models. The compatibility of the XE series computers with prior models guarantees that the existing base of software, peripherals, and applications will survive without growing obsolete.

The 65XE computer is compatible with the ATARI 800XL computer system yet costs less. It includes the features of the 800XL with a new sleeker case and improved keyboard which brings the angle and height of the keys to the optimum position for a minimum of hand and wrist fatigue. Extensive use of high technology made it possible to use fewer chips and moving parts, resulting in improved product quality while lowering the retail price.

The ATARI 130XE computer brings 128K RAM power to the sub $200.00 retail market. The 130XE retains full compatibility with prior ATARI computers but offers increased performance for memory intensive programs such as word processing and spread sheets.

XE Series Features

The XE series computers are full-featured 8-bit home computer systems. They are programmable in the BASIC language (built-in, with expanded versions available as add-ons). Other languages such as Logo, Pilot, C, Action!, and assembly language are also available. The system can be expanded to include disk drives, printers, modems, game controllers, program cartridges, cassette recorder, and other accessories. And it is compatible with one of the widest varieties of software available.

Sixteen graphics modes with varying tradeoffs between fine resolution, number of displayable colors and memory usage, give a degree of flexibility found in no other product line. The highest resolution gives 320 dots ("pixels") per line and 192 lines. The special video circuits can create 256 different shades consisting of 16 different colors with 8 luminance (brightness) levels each.

Custom circuitry also gives the XE series unique animation features. Independent objects called "players" and "missiles" create clean animation without tedious programming. The system automatically senses collisions between objects. And the screen "scrolls" sideways and up-and-down automatically. These features combine for a library of games and other software with visual excitement and clarity that is unique in their price range.

The companion to the graphics and animation is programmable sound and music. The XE has four separate sound channels for true harmony, each channel with the widest dynamic sound range of any home computer.

The full-stroke typewriter-style keyboard also includes special function keys, control key, inverse graphics key, and cursor keys. The cursor keys let you edit programs with the ease of a word processor including advanced functions like inserting and deleting whole lines or single characters. The character set includes upper and lower case letters, graphics characters, and a special international character set.

When using a disk drive, an advanced DOS (Disk Operating System) loads into the computer's memory. This menu-operated program makes it simple to perform operations like backing up diskettes and programs, whether the system has a single drive or several. The disk drive can automatically run the program on disk when the computer is turned on—without learning a single computer command!

Interface ports for expansion include the SIO port for disks, printer, modems, and eassette decks; a cartridge port for ROM programs; two joystick ports; a monitor port for clearer pictures and sound; and a standard TV signal. There is, however, no PIO connector which had been present on the 800XL but had never been used for anything.

Finally, the XE series is as fully supported as prior Atari products. A network of 1,500 independent service centers provide repairs locally. Within the warranty period, the place of purchase will exchange a defective unit for a brand new one. Atari maintains a customer relations department for telephone and written questions. The Atari user groups, among the strongest in the industry, welcome new members and provide advice and public-domain software programs. And, of course, the *ATARI EXPLORER* magazine covers the XE and all other 8-bit Atari computer products.

XE-Series Peripherals

Three new ATARI XE-family printers have been developed to provide low cost, high speed, and high print quality options. A letter quality daisy wheel printer, a low cost dot matrix thermal transfer printer, and a high speed (80 characters per second) dot matrix impact printer are offered. Both near-letter-quality capability.

The ATARI 300-baud modem provides a high level of modem functionality at very low price. Advanced features designed into this modem include pulse or tone dial, automatic dialing and automatic answering. The modem includes a communications software package which allows users to access popular telecomputing services like the Source or Compuserve, and to upload and download programs and information to their XE computer.

ATARI® PROUDLY PRESENTS

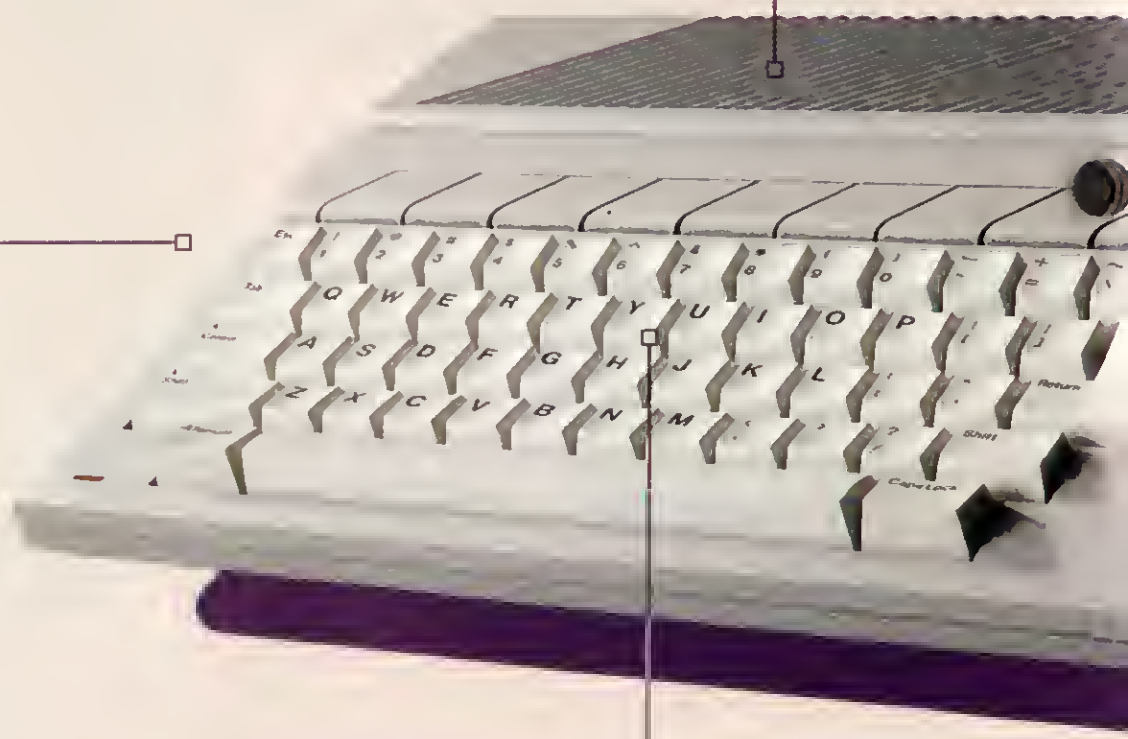
The Atari 130ST and 520ST

Microprocessor

The powerful 16/32-bit MC68000 microprocessor is the heart of the ST computer system. The super-fast CPU operates at a dazzling eight-million cycles per second, bringing advanced capabilities such as sound generation, and high-speed multi-colored graphics to the system.

Cartridge

Slot for programs and easy ROM expansion.



Keyboard

The keyboard's functional design features a standard typewriter layout, numeric keypad, editing keys, and ten special function keys.

ADVANCED

BASIC or LOGO Language Your option of either Atari's flexible BASIC language, including over seventy-five instructions, or Atari's Advanced LOGO, **the educator's first choice.**

BUILT-IN EXPANSION PORTS

RS232C Serial Input/Out Port for modems and other serial devices

Centronics-type Parallel Port for high-speed printing applications

Disk Drive Port for plug-in addition of 3.5 inch disk drives

High-Speed Hard Disk Interface Port transfers data at 1.3 megabytes per second.

TV Modulator and Monitor Jack

Color High-resolution Monitor Jack (R.G.B. Analog)

Monochrome High-resolution Monitor Jack

JOYSTICK and Mouse Ports

THE EASY-TO-USE ST . . .

TODAY'S MOST VERSATILE AND POWERFUL PERSONAL COMPUTER

The **Atari ST** is today's most versatile and powerful personal computer.

The **130ST** comes standard with 128K of useable Random Access Memory, while the powerful **520ST** boasts a substantial 512K. Both ST models have 192K of ROM, and can be expanded to 320K with a 128K plug-in cartridge.

But what makes the ST personal computer revolutionary is it's ability to put all this computing power at your command. Traditional computer commands and keyboard entries have been replaced with easy-to-understand graphic images and an easy-to-use pointing device called a *mouse*.

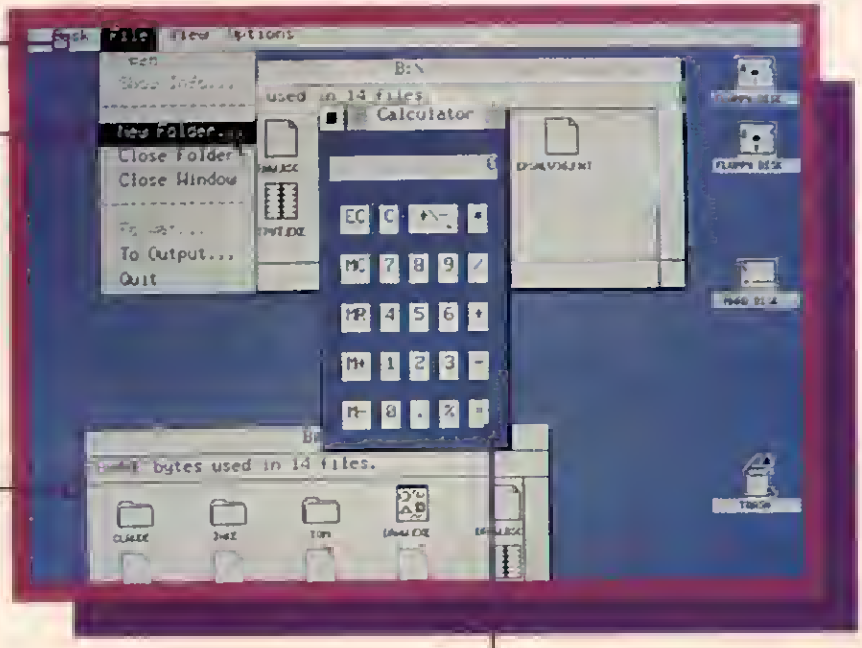
Use the mouse to point to one of the screen's graphic representations, click a button to make your selection, and watch the ST computer instantly go into action.

You'll actually be producing useful work on your ST computer moments after it is set up. Its operation is that simple.

TOMMOROW'S COMPUTER TODAY

- 16/32 bit MC68000 Microprocessor
- Your Choice of either 128K (130ST) or 512K (520ST) RAM
- Expandable ROM
- Optional BASIC or LOGO Language
- 512 Vibrant Colors
- Three Graphics and Text Displays
- Built-in Drawing Package
- Sound Generator
- Musical Instrument Controller
- Joystick, or Mouse
- RS232C Serial Interface
- Centronics-compatible Parallel Interface
- 3.5 inch Disk Drive Expansion Port and Controller
- High-speed Hard Disk Interface
- TV Modulator
- High-resolution Color Monitor Output (R.G.B. Analog)
- High-resolution Monochrome Monitor Output

TASKSHARING LETS YOU TACKLE LARGE JOBS WITH EASE



The Atari ST personal computer's *tasksharing* ability makes working at your computer easier than working at your desk. The ST's display is as familiar as your desktop, complete with all the objects you usually work with, such as documents, file folders, a calculator, scissors, paperclips, and of course a waste-basket. You can, for example, create a customized inter-office memo by writing it with a word processing program, then "cut-and-paste" information from your spreadsheet and database files. *Tasksharing* makes integrating documents easier on the screen than at your desk.

FOLDERS

Store and retrieve your work from folders that let you organize your papers on disk for quick reference. You could, for example, name a folder "JAKE," to hold all your correspondence with your friend Jacob. ST applications software also allows you to place folders within folders for better organization.

DISKS

Your folders and documents are stored on 3.5 inch microdisks or hard disk for fast access to all your information.

DESKTOP UTILITIES

Stationery, a calculator, and applications software are all as handy as a click of the mouse button.

MENU BARS AND DROP DOWN MENUS

Each ST function is selected from the Menu Bar and Drop-Down Menus. To open a file folder and view its contents, for example, just move the mouse pointer to "File" press the mouse button and a Drop-Down option menu appears. Then, move the mouse to select "Show Info..."

MOUSE

The easy-to-use mouse replaces complex computer commands and keyboard entries. As you roll the mouse across your desktop, a pointer moves across your display. To make a selection, you simply point to one of the display's graphic images and click the mouse button.

THERE'S MORE TO LIFE THAN BLACK AND WHITE.

MULTI-COLORED DISPLAYS ENCHANCE YOUR SPECTRUM OF POSSIBILITIES.

Give your presentations the impact they deserve with your choice of three graphics and text displays and more than 500 vibrant colors.

The **Intense Color Display** produces 320-by-200 dots with 16 colors on the screen for image-perfect text and graphics.

The **High Resolution Color Display** offers a choice of four colors on a crystal clear 640-by-200 display area.

The 640-by-400 dot **Monochrome hi-res display** (a total of more than a quarter-million dots) makes picture definition so crisp and clear you'll think you're looking at a high-quality photograph.

THE ARTISTIC ATARI

Your every artistic whim becomes colorful reality with the ST computer's resident line-drawing and high-speed animation capabilities.

Bit Block Transfer Equals Graphic Power

Bit Block Transfer makes it easy to design multicolored presentations or create sophisticated computer art by allowing you to relocate, rotate, or copy entire sections of your display.

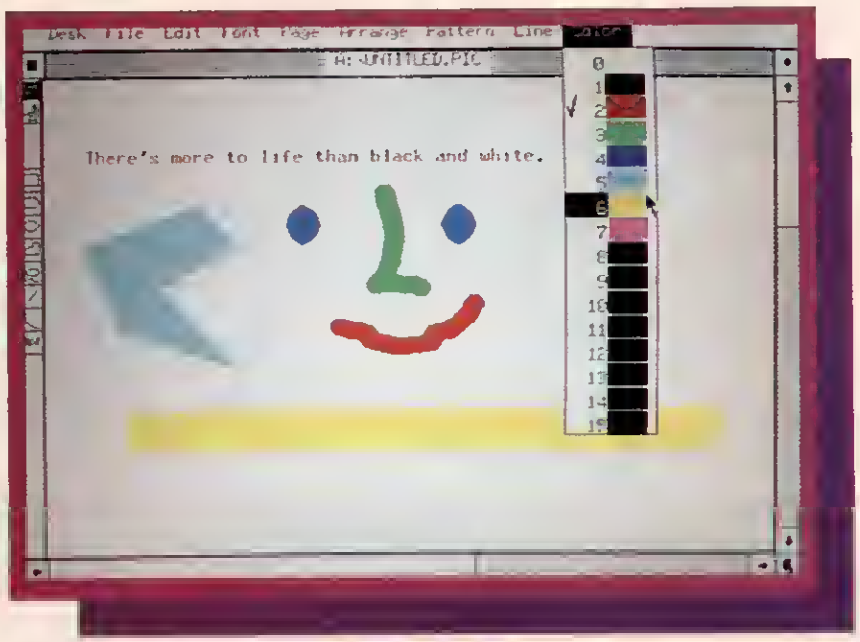
THE ST PERSONAL COMPUTER SOUNDS TERRIFIC!

The ST computer's sound generator composes and produces three-voice harmony with three separate pitch and volume settings. The sound generator's outstanding musical range produces tones as deep as 30 Hertz to higher than the human ear can detect. And, the ST's waveform shaping controls make each note sound as if it were played on a symphonic instrument.

The ST Personal Computer Puts You In Control of Electronic Musical Instruments

The ST's musical ability moves one step beyond internally produced sound with its standard **Musical Instrument Digital Interface** (MIDI). The MIDI puts the ST computer in control of the newest generation of electronic musical instruments.

TAKE CHARGE AND DESIGN YOUR OWN APPLICATIONS WITH ADVANCED BASIC OR LOGO LANGUAGES



This drawing application typifies the ST Personal Computer's versatility

ADVANCED BASIC

FOR ADVANCED APPLICATIONS

Atari's new and flexible version of BASIC includes over seventy-five instructions that let you control the computer's memory operations, its input/output functions, and perform complex mathematics. Atari's easy to learn BASIC language puts the power of the ST family of Personal Computers at your fingertips.

MACHINE LANGUAGE

PROGRAMMERS TAKE NOTE

The ST16/32bit MC68000 microprocessor was designed with advanced programming tasks in mind. Fifty-six instructions, fourteen adressing modes, and five different data types give machine language programmers the tools to design high-quality ST application software.

THE EDUCATOR'S CHOICE

LOGO, the language of educators and artifical intelligence, is available for the ST computer. Although LOGO is the perfect beginner's language, it offers the power of limitless growth. Begin hy drawing with LOGO, then move on to the world of artificial intelligence.

BUILT-IN EXPANDABILITY ADDS UP TO BUILT-IN-VALUE

ADD UP THESE FEATURES

- RS232C serial port for serial devices such as modems or printers.
- Centronics-compatible parallel port for high-speed printing.
- Cartridge Slot for programs and memory expansion.
- 3.5 inch microdisk drive port, and disk controller.
- High-speed hard disk interface that transfers data at an awesome 1.3 megabytes per second.
- TV modulator and port for easy connection to your color or black-and-white television.
- Composite or R.G.B. high resolution color monitor output.
- Extra high resolution monochrome display output.
- Two Joystick ports: one doubles as the **mouse** port.

SYSTEM SPECIFICATIONS

GRAPHICS:

- 32K bit mapped screen
- 3 Graphics Modes:
  - —320 x 200 pixels, 16 colors
  - —640 x 200 pixels, 4 colors
  - —640 x 400 pixels, monochrome
- 512 colors (8 levels each of red, green, and blue)

SOUND EFFECTS AND MUSIC:

- General Instruments Sound Chip
  - —Frequency controllable from 30 Hz to above audible range
  - —3 channels, separate frequency and amplitude (volume) control
  - —Dynamic envelope controls, ADSR, noise generator
- MIDI Interface to control external synthesizers

KEYBOARD:

- Standard typewriter-style
- Ergonometric height and angle
- 18-key numeric keypad
- Cursor control keypad
- Contains separate microprocessor

MOUSE:

- Eliminates the need for extensive user training
- Flexible operation

MAIN PROCESSOR:

- MC68000 16/32 bit central processing unit
  - —8 32-bit data registers
  - —8 32-bit address registers
  - —16-bit data bus
  - —24-bit address bus
  - —7 levels of interrupts
  - —56 instructions, 14 addressing modes, 5 data types

POWER REQUIREMENTS:

- 115V AV
- 60 Hz
- 50W

COMMUNICATIONS INTERFACES:

- Centronics parallel for printers
- RS232C for modems
- Diskette controller and interface
- High speed hard disk interface (1.33 megabytes per second)
- 2 joystick ports; one of which is configured for a mouse

DIMENSIONS:

- .475 millimeters wide, 233.5 mm deep, 62 mm high

ENVIRONMENTAL REQUIREMENTS:

- Temperature
  - —Operating: 5 to 40 degrees Celsius
  - —Storage: 0 to 60 degrees C.
  - —Shipping: -30 to 60 degrees C.
- Humidity
  - —Operating: 10 to 85%, noncondensing
  - —Storage: 5 to 95%, noncondensing

OPERATING SYSTEM:

- GSX™ graphics kernel
  - —Bit Block Transfer (BitBlt)
  - —Vector drawing
- GEM™ user interface
  - —icons
  - —windows
  - —mouse controller
  - —pop-up menus
  - —memory management system
  - —Real-time clock

MEMORY:

- 192K (196,608 bytes) ROM built-in
- 320K, (327,680 bytes) maximum ROM with plug-in cartridges containing up to 128K
- RAM: 128K (131,072 bytes), or 512K (524,288 bytes)

VIDEO PORTS:

- Television
- Composite video
- RGB
- High-resolution monochrome monitor

Atari® Personal Computers

- - - Power without The Price

All system specifications are subject to change without notice.

NASA's ATARI User Group

By
Charles Rubin

A sound chip and Player/Missile Graphics make the Atari Computer a favorite for game designers, but its real computing power is increasingly being put to more serious uses. When some of America's gurus of higher tech in aeronautics and computer design need to experiment with sound and graphics applications, the tool they choose is an Atari Computer.

Probably the greatest concentration of high-tech Atari Computer owners can be found in the Peninsula Atari Computer Enthusiasts group in Hampton, Virginia. According to group president George Ware, some 70 percent of the group's members are engineers at the nearby NASA Langley Research Center. The Langley Research Center is the original NASA research center dating back to the days of the Army Air Corps. Langley, as employees call it, does the basic research in aeronautics, space research, electronics, and structures that is implemented later in specific projects. Using technology developed at Langley, other NASA facilities such as the Johnson Space Center in Texas, California's Jet Propulsion Laboratories, and the Kennedy Space Center in Florida then tackle specific programs like the Space Shuttle.

Engineers at Langley have access to staggeringly expensive high-powered tools, including Cyber supercomputers, Prime mainframes, DEC VAX-11/780 minicomputers, and dedicated graphics terminals; but for several applications, Atari Computers are the tool of choice. Engineers like them because they're small, inexpensive, and better at sound and graphics than computers costing several times as much. In programming and telecommunications, Atari Computers help engineers make more efficient use of the larger computers, and in graphics, they're being used for basic research in flight simulation and graphics displays.

Inside the Nuts & Bolts

Olaf Storaasli works in structures research at Langley with the help of two Atari 800s, an Atari 400 upgraded with expanded memory, and a floating point processor. Storaasli's work involves creating computer models of aircraft structures for simulating flight stresses to determine strength. The actual modeling takes place on a specially built computer called the Finite Element Machine, which Storaasli helped design. The machine is actually a parallel processor; it increases computing power by breaking mammoth calculations into smaller units which can be handled by individual processors. Since the Finite Element Machine is also used by several other engineers for modeling, Storaasli uses his Atari Computers to make more efficient use of his time.

The modeling process is extremely complex. Storaasli calls his structures "Tinkertoys" because they contain hundreds of small parts, each represented on the computer by a series of engineering equations specifying the strength of the part. A model of an aircraft wing, for example, would include stress equations for the affected points of every spar, bolt, rib and surface panel. Since many points in the wing (the intersection of two spars, for example) can undergo stress from any of six different directions, they each require six stress equations.

Storaasli must run a Pascal program on the Finite Element Machine to realistically simulate various kinds of stress. Since the program requires that the computer solve thousands of complex equations, the modeling process takes several hours. The last thing an engineer needs are incorrect equations in the Pascal program, or an incorrect program. With a processing time of several hours errors might not be detected until the job was finished. Using the Atari 800 in his office, Storaasli can debug the PASCAL source code he feeds into the Finite Element Machine.

With the Finite Element Machine so busy, it's often late in the day before

Storaasli can get time on the computer, so he uses an Atari 800 to monitor the operation from his home. He connects to the Finite Element Machine and examines preliminary results of the model. If he spots a problem, he alters the program immediately. Storaasli then retires for the night knowing that the proper results will be waiting for him in the morning.

Telecommunications from home is a big application with other Atari Computer users at Langley. George Ware says, "People will do things at work, and start running a model on a computer, and then realize on the way home that they want to change something. For example, maybe you're simulating an object entering the earth's atmosphere at 32,000 miles per hour, and while you're driving home you realize you really should have run it at 16,000 mph. If you've got a computer at home, you can change that sort of thing. Without it, you'd have to wait until you got back to work in the morning, and you'd have to put the change into a job queue and wait for it."

The Friendly Skies of Atari

Telecommunications and programming are applications that Langley's engineers might perform with any personal computer, as are word processing, database management and spreadsheeting. But the unique graphics and sound abilities of the Atari Computer have proved overwhelmingly popular at Langley. Jack Hatfield is head of the Cockpit Systems Branch at Langley, and is overseeing the use of Atari Computers to produce low-cost graphics displays for airplane cockpits.

"I got interested in the potential for low-cost graphics displays in airplane cockpits," Hatfield says. "We have low-cost machines like the Atari Computer that can provide excellent graphics, and we wanted to explore and demonstrate the use of this level of technology to replace the old electromechanical instruments in airplanes." Hatfield chose an Atari 800 because it offered the best graphics for the kinds of displays they wanted to create.

"At the end of 1982," Hatfield recalls, "we got George Rice, a student in a co-op engineering program from Mississippi State University. He started programming an Atari Computer to display the ouput of flight simulations being run on a ROLM minicomputer. The minicomputer created simulated airplane information, which was then displayed through the Atari 800. One of the nice things about using an electronic display format is that you don't have to recreate exactly what an electro-mechanical device shows," says Hatfield. "You can go to more pictorial information, and use formats that integrate better than pointers and dials."

One example of the displays Rice came up with replaced the traditional Horizontal Situation Indicator, an electromechanical instrument that uses a set of cross-hairs against a dial. The cross-hairs move to show the horizontal position of the plane's wings. The present Atari electronic display also shows the horizontal situation of the wings, but this is superimposed over a map of the flight path, so that the pilot can see relative position between two points on the flight path. The map shows major landmarks and radar navigation stations, as well as displaying numeric heading indicators of the plane's course.

Another engine display has eight groups of moving vertical bars like animated bar graphs that indicate oil pressure, temperature, rpm, fuel flow, fuel level, manifold pressure, exhaust gas temperature, and amps. Each graph moves against a scale, and there's a digital readout of the levels above each graph. The display is programmed so that the color of each bar changes as the readings rise or fall—bars change from green to amber when a caution level is reached, and to red when the reading hits the danger zone. Says Tony Busquets, a research engineer on the project, "The displays present information in an easier way. With the old dials, you have to interpret the information. With an integrated display, you can see what's happening at a glance."

Along with providing more instantly readable data, electronic displays are more reliable and accurate. "The old instruments are getting too difficult to maintain," says Hatfield. "They take a watchmaker's skills to repair."

The displays were demonstrated in a desktop flight simulator in July, 1983 at the Experimental Aircraft Show at Oshkosh, Wisconsin. The ROLM minicomputer provided the simulated flight information, and three Atari 800s were set up on desktops with joysticks, so people could switch between graphic displays of different flight information and see the displays change as the "airplane" changed position.

The displays were very popular at Oshkosh, and the exposure resulted in a call from at least one flight simulator manufacturer interested in using Atari Computers in a multiuser environment to display simulated confrontations between tactical military aircraft. Another interested onlooker was John Parks, the Range Safety Officer at the Wallops Island Launching Facility of NASA's Goddard Space Flight Center.

Park's main interests are displays that present weather and routing information. His system uses two Atari computers—one acts as a receiver and display generator in the aircraft, and the other gathers and transmits weather and geographical information from the ground.

Park wants the ground stations placed at VOR radio sites around the country. The ground station would transmit color-coded information about the air's moisture content—a traditional indicator of good or bad weather. The computer in the aircraft would combine the information with on-board indicators of speed, heading and weather immediately outside, and generate a color-coded map showing the relative weather between the plane's location and the ground station. If the moisture content changes between the two points the map's colors would reflect it.

Along with weather information, Parks is working on location and height map display. "The pilot can punch a button to change the displays," he says. "One will show weather and obstructions in a 150-mile radius of the plane, while another shows them in a 40-mile radius of the plane. Objects less than 500 feet below the plane will blink on the 40-mile map to draw the pilot's attention." Parks is programming a height-distance sensitivity function. If an obstruction is less than 30 seconds away, the 40-mile display is automatically switched on, and an avoidance pattern helps the pilot maneuver around the obstacle. Another display would show the two closest airports, active runways, and weather.

Parks and Hatfield optimistically believe that their research will eventually have commercial applications. "I'm trying to keep the cost down to about $1,000-1,500 for the airplane equipment," Parks says. "The final system using an Atari Computer should be able to run with just the RAM and a ROM cartridge—it could end up costing only $500-600 for the whole package, minus the actual receiver."

Hatfield feels that graphics displays will soon appear in commercial airliners like the Boeing 767 and the Airbus A310, but that it will take several years before they find their way into private aircraft. Whatever the outcome of the flight simulation research, these NASA's engineers have shown that the Atari 800's inexpensive bundle of computing power can play a key role in this nation's aeronautics research.

Atari-Aided Design

Neal Lincoln designed supercomputers for 15 years at Control Data in Minneapolis, and last August he started his own company to design supercomputers. Lincoln uses four microcomputers in his home and at his office to aid his work.

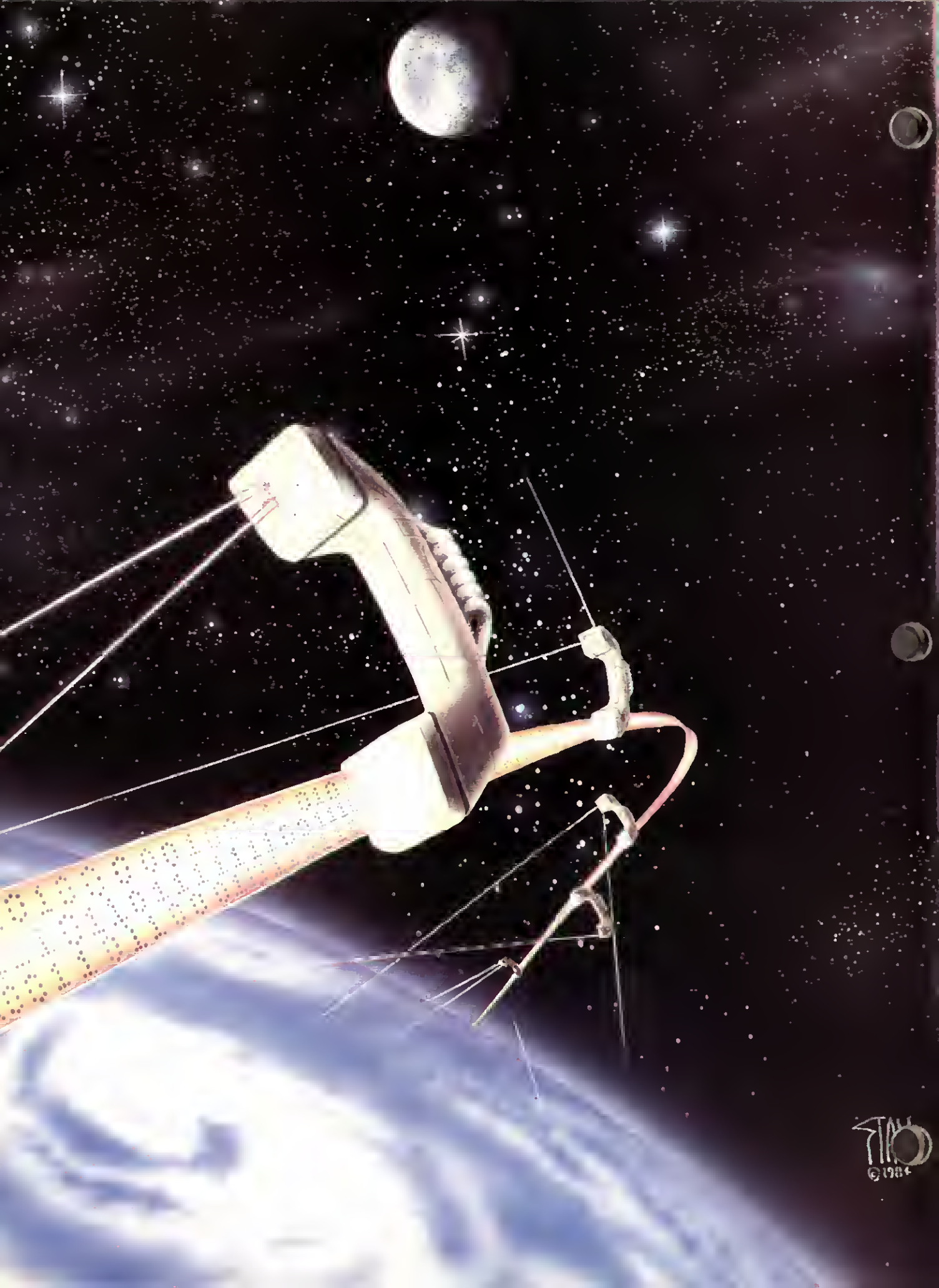
"I have an Atari 400 that I turned into a "600" with an add-on keyboard and a memory expansion," he says. "I also have a standard Atari 800." While he uses a Zenith Z-100 and a Stearns (a high-speed IBM PC clone) for number-crunching, Lincoln is using the Atari computers to demonstrate the use of color and sound in electronic circuit design.

"Our design work revolves around a logic family (a group of specific circuits) that are referred to as macros. A macro is a collection of certain gates in a circuit, and the macros are represented by numbers. I'm using the Atari computer's graphics and sound to provide additional information to the designer when he uses the macros."

It's difficult for an engineer to remember the properties of dozens of macro. "I use a system of audio feedback and screen prompts to supply macro information," Lincoln says. "The designer enters information with a joystick by selecting macro numbers, and a computer voice tells him the number of the macro and what it's properties are." Lincoln uses SAM (Software Animated Mouth) to produce the voice synthesis on the Atari. "For example," he says, "an engineer might enter macro number 10. Once the macro is specified, SAM says, 'This is a two-way exclusive/or, and the output is inverted.'"

With a voice reminder the engineer can concentrate on the design process. Lincoln likes the Atari computer because it's easy to program sound and graphics, and it's multi-plane graphics have the potential to display more information. "With single-plane graphics," he says, "you have only the area of the screen to display information. But with multi-plane graphics, you can store information "inside" a particular screen area and zoom in to reveal further information."

Lincoln points to the five-chip design of the Atari computer as the reason it can handle the sound, graphics and processing so well. "My Zenith has higher resolution," he says, "but there are only three colors, and no intensity control or sound. The Stearns has even higher resolution than the Zenith, but it only has one color." Like the engineers at NASA, Lincoln credits the separate graphics and sound processors in the Atari Computer for its ability to display multi-plane graphics and produce sound without slowing down programs. Single-chip computers that try to handle sound, color and data processing can only do one of these things at a time, they can't offer the sound/color combination that the Atari can, even if the processor itself is more sophisticated.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ATARI TELECOMPUTING

REACHING OUT TO THE WORLD

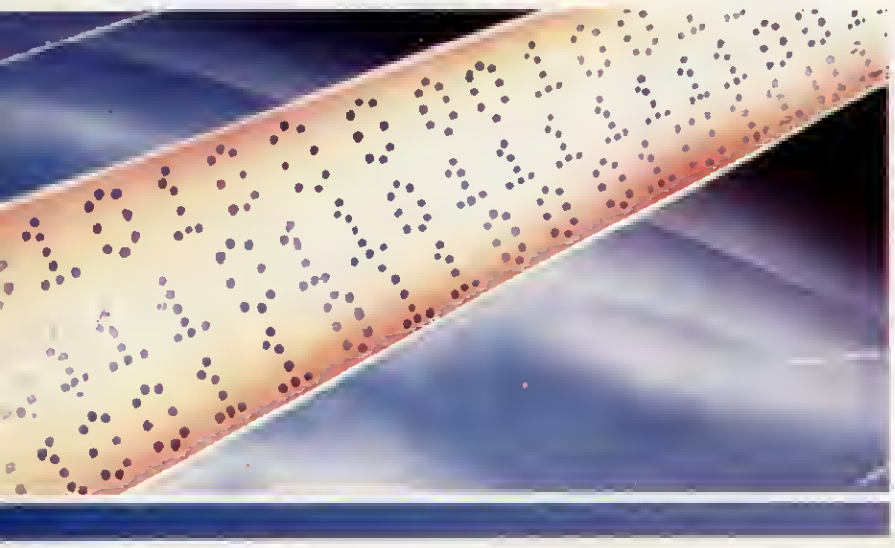
by Cassie Stahl, Jeff Bass and Len Lyons

As computer citizens of the world, our activities increasingly involve an exchange of information. Keeping in touch with the world of the 80s, plus news, business developments, and the latest movies, researching a term paper or a legal brief, corresponding with friends, and ordering products—all have a common element: the receiving or transmitting of information.

You can pursue any of these activities at your convenience by putting the computer to work as an information retrieval tool. With telecommunications, there's no need to wait for the morning paper to read the news, no need to go to the library to read encyclopedia articles. You don't have to depend on the U.S. Mail to deliver written correspondence and you can shop at home for almost anything at any time of night or day.

Illustrated by STAN ZARUBIN

Telecommunications (the term now in vogue is telecomputing) refers to transmitting information between computers over telephone lines. Information in this context means anything that can be stored in a computer's memory, including stock quotes, novels, airline schedules, scientific data, graphic images, and programs of all types—from stock-analysis software to video games.



CompuServe
CompuServe Information Service, Inc.
5000 Arlington Centre Blvd.
Columbus, OH 43220.
Telephone: (800) 848-8990 or in Ohio (614) 457-8650.
Subscribers: About 100,000.

Cost: A one-time sign-up fee of $20; weekdays, 6 p.m. to 5 a.m. and all day weekends and holidays: $6.25 per hour. Any other time: $12.50 per hour. (No minimum usage.)

Features: A broad-based service and an excellent place to start. Its "CB" network, which allows dozens of callers to converse online (by typing on their keyboards), is very popular. There's also a 5000-member Atari Special Interest Group (SIG) bulletin board which contains a wealth of information about Atari products as well as public-domain software for downloading.

Reach out!

The CompuServe CB simulator, for example, provides a forum where many different people can come together and discuss their favorite topics with guest "speakers" from the industry. These conferences, often scheduled far in advance, can put you in direct contact with industry leaders and innovators.

Even friendships form through the various communication services. Once accused of breeding anti-social behavior, computers are now bringing people closer together. In fact, a marriage took place on CompuServe's CB simulator on Valentine's Day in 1983. George Stickles and Debbie Fuhrman made their vows "public" from their terminal in Grand Prairie, Texas, to wedding guests in attendance from the sunny Pacific shores to the New York skyline. It's an example of the intensity of on-line relationships, a growing phenomenon of our decade.

With all visible and aural prejudices removed, it is easier to form friendships based on mutual interests and values. Of course, there does exist a small bit of prejudice — poor typing skills can kill your electronic social life because the other person literally pays for your typing time! It is also easy to be duped into thinking you are talking to the mate of your dreams only to find out later you were talking to a fifteen-year-old or worse yet, a person pretending to be a member of the opposite sex. It happens, but not often.

Users uphold a self-imposed code of ethics on the different systems and playing the charlatan is bound to get you ostracized. Because you can save and print out your on-line conversations, lies and discrepancies quickly become apparent. Foul language is not tolerated and is another reason for removal if the user persists. The majority of users are honest when discussing themselves because of the cost of meeting someone on-line. This electronic environment, complete with its own rules of social etiquette, promotes positive interaction among the system users and it is not surprising that close friendships develop.

Another service known as electronic mail is a common method for sending messages to other system users. The sender uses his modem and home computer to make the connection with one of the systems. After the initial log-on procedures are completed, the electronic mail section is selected from the menu, and the user moves into the specified message base. The message is typed on-line and can be edited before storing it. Typically, the service acts as a holding station, retaining the message in its computer storage banks until it is read by the appropriate person. After it has been read, the system operator (SYSOP) can then remove the message with an electronic swipe.

Join the Information Nation

Computers have long been involved in exchanging data relevant to national defense, finances, and scientific projects. Since the spread of home computers, information services have sprung up to make telecommunications useful to virtually anyone. The advantages will probably exceed your expectations. What you can find out and accomplish "on-line" can be loosely classified under these five categories:

Information: News, weather, sports, stock quotes, research material in a variety of subjects, travel and transportation information.

Communication: Message posting, electronic mail, conferencing, and outlets to the U.S. Postal Service,

Telex, and other carriers.

Transaction: Purchasing products, trading stocks, making travel reservations, banking, and bill-paying.

Entertainment: Topical and trivia quizzes, movie reviews, video games, dating services and group conferences.

Computing: Free software, advice and assistance, hardware and software on sale (used and discounted), the use of powerful mainframe languages to run your own programs.

For all the futuristic capabilities it offers, telecomputing is surprisingly simple and inexpensive. You'll probably be ready to "go on-line" within twenty or thirty minutes of setting up your system.

The Source

The Source Telecomputing Company
1616 Anderson Rd.
McLean, VA 22102.
Telephone: (800) 336-3300, or in Virginia and Washington, D.C. (703) 734-7540.
Subscribers: about 75,000

Cost: Monthly minimum: $10. One-time sign-up free: $100 (there are frequent promotional offers to join for $49.95); weekdays, 6 p.m. to 6:59 a.m., or weekends and holidays: $7.75 per hour. Any other time: $20.75

Features: The Source is the easiest to use of the services. Its only conference system (PARTicipate) attracts serious and informed participants nationwide. The Source attracts many professionals and business users. There is an Atari bulletin board, but it's sparse compared to CompuServe's.

How it Works

To go on-line, you need a modem — a device that acts as an interpreter between your computer and the telephone lines — and terminal software, a program that enables your computer to behave like a terminal for the computer you're talking to.

This terminal software enables you to send information from your computer through the modem and over the phone lines to a waiting modem at the other end of the line. Your modem can also receive information from the remote computer by reconverting it from telephone line (or analog) signals to computer (or digital) signals.

Computers of virtually any type can communicate because the signals are interpreted according to a standard code that represents letters, numbers, and other special characters. This commonly accepted system is known as ASCII—the American Symbolic Code of Information Interchange. Atari computers use a special version of ASCII, called ATASCII, but your communications software automatically translates ATASCII into normal ASCII so that you can exchange information with non-ATARI computers.

In addition to the ASCII code, the communicating computers must agree on the how fast the information is transmitted (or the baud rate), and the form in which the individual characters are sent. If ASCII is a common language, these settings make sure the computers are speaking the same dialect. This means you have to specify such things as the word length (the length of a character in bits), duplex, parity, and stop bits. If these terms are unfamiliar, don't let them scare you, terminal software usually enables you to set them correctly with a few keystrokes.

Before going on-line, you have to know whom to call and how to get connected. Let's look first at the kinds of services that you'll find on the other end of the line.

Information Supermarkets

An all-purpose information service usually offers its subscribers most of the features in the five categories listed above. The major information services are CompuServe, Dow Jones News/Retrieval (DJN/R), The Source, and Delphi. As a subscriber, you can tap into the AP and UPI news wires (updated hourly) and the Official Airlines Guide flight schedules, or chat with other callers on-line by typing on the keyboard, shop by computer—and use literally hundreds of useful and entertaining features.

A single-purpose service called Comp-U-Store enables you to shop at home, 24-hours-a-day, and at discounts of up to 40%. Comp-U-Store is a computerized ordering system, offering about 50,000 different products, from sporting goods to electronics equipment. While on-line, you can get prices, read product descriptions, and place an order. Merchandise is shipped directly from the manufacturer with the normal warranties.

To use any of the services mentioned above, you must become a subscriber. Usually, this means paying a one-time sign-up fee entitling you to a

Dow Jones News/Retrieval

Dow Jones News/Retrieval
P.O. Box 300
Princeton, NJ 08540
Telephone: (800) 257-5114, or in New Jersey (609) 452-1511
Subscribers: about 150,000

Cost: One-time sign-up fee: $75. (Purchasing the Dow Jones Connector—an information kit—at any software outlet costs $49.95 and entitles you to waive the sign-up fee.) Weekdays, 6 p.m. (local time) to 4 a.m. (EST), weekends, and holidays: $0.20 - .90 per minute, depending upon the feature accessed. Any other time: $0.60 - 1.20 per minute. (No minimum usage.)

Features: This service is operated by the publishers of The Wall Street Journal, which should tell you that it specializes in up-to-the minute, as well as historical, information on stocks and other financial issues.

Serious investors and brokers consider the service essential. But there are many general interest features, too, such as news, sports, movie reviews, and online encyclopedia, and shopping by computer.

password—an alphanumeric code that gives you access to the system. You should also expect to pay a monthly connect-time charge based on the number of minutes you use the service. The cost is generally between 10 and 15 cents per minute. (Only The Source has a minimum monthly usage fee; the others bill you only if you spend time on-line.)

Unless you're using a service for your business, going on-line will probably be a nocturnal or weekend pastime. The rates can be twice as high during business (or prime) hours. The standard rates generally apply from 6 p.m. to 6:59 a.m., weekends and holidays.

PLATO

PLATO Services Network was developed in 1962 at the University of Illinois. Control Data Corporation (CDC) bought the marketing and trademark rights to the PLATO software in 1976. They developed the PLATO terminal—a high resolution touch sensitive screen with a dedicated keyboard plus graphics printer and 1200 baud modem. CDC also developed terminal 'emulators' that allow the Zenith-100, IBM PC and others to connect to the PLATO system. This was the beginning of HomeLink, a special after-hours, reduced rate service aimed at the personal computer owner.

In the past, PLATO was used by large corporations who could afford the expensive ($50.00 per hour) log-on rates. The many lessons available on PLATO were used to supplement employee education and to teach students who had access to terminals in their schools. With the introduction of the Atari PLATO cartridge, Homelink became available to Atari computer users who can now meet each other on PLATO, and expand their education for $5.00 per hour. The lessons on line represent over 200,000 hours of courseware—considered to be the largest educational software base in existance.

PLATO offers several helpful communication features. You can page someone on-line and they can respond immediately or let you know they are too busy to talk. When you need assistance on PLATO, on-line experts are capable of guiding you through the many options you have available.

CompuServe

This is the place to go for electronic assistance with your Atari computer. CompuServe offers a special area for Atari users know as SIG Atari (SIG stands for Special Interest Group) that consists of a message base and related databases. Each database contains download files grouped according to subject. Most problems are solved on CompuServe by the SIG SYSOPS. SYSOP team members all try to answer the many questions that appear in the Atari SIG. Sometimes the information they provide can make you love a product that two hours ago you thought was worthless.

A download file on the Atari SIG can turn your Atari 835 or 1030 modem into a downloading demon! If you don't have a program that downloads, the Sysop will mail it to you. Once you have the program (TSCOPE or DISKLINK) you can return to the SIG and download to your hearts content.

Don't forget to visit the CB simulator area of CompuServe. This is the "CompuServe town square," a place where the regulars gather to gossip. Participants need not reveal their identity. Most people announce their presence, but there are still some "lurkers" who prefer to stay hidden away and eavesdrop on your conversation.

You can sit in your home and meet people around the country without making a long distance call.

If you do meet someone on-line you like, you can enter a private conversation with them on another channel of the CB simulator. The download

databases contain a wealth of public domain software that can help you in many ways. Besides the terminal software available, you will also find games, utilities and application software. A large selection of quality public domain software, written by SIG members and others, can be found on CompuServe.

Comp-U-Store
Comp-U-Store
777 Summer St.
Stamford, CT 06901
Telephone: (800) 843-7777, or in Connecticut (203) 324-9261
Subscribers:
Cost: Membership: $25 per year; $44 for two years. Weekdays, 5:01 p.m. - 8:59 a.m., weekends, and holidays: $6 per hour. Any other time: $18 per hour. (No minimum usage.)
Features: (See discussion above.) Comp-U-Store can be accessed directly or via any of the services above, even if you're not a member. However, membership is required for purchasing products. There is no extra charge for accessing Comp-U-Store while connected to one of the other services.

The Source

The Source has had its share of on-line romances, most of them getting their start on Dial-A-Date, the electronic equivalent of a blind date. The most famous couple is Tom Johnson and Dawn Debbe who met on-line, and after a one year romance, married in September 1984. While you may not plan on meeting your ideal mate through this Dial-A-Date service, you might want to meet other Atari users for fun and technical assistance through electronic mail. The majority of users are still men, although women are showing up in greater numbers.

The Source has a large message base, called Source Mail, that is divided into areas of specific interest. Atari users have their own message base that can be entered using the commands POST ATARI READ after the command prompt. The messages are mostly technical questions offered to other Source users for answers. With everyone on-line sharing resources and information, even difficult problems are quickly solved.

Users you meet on the Source may be making similar equipment purchases and can often provide you with the technical support you need to finish your customized equipment configurations.

Delphi
General Videotex Corporation
3 Blackstone St.
Cambridge, MA 02139
Telephone: (800) 544-4005, or in Massachusetts (617) 491-3393
Subscribers: 3,000 (400 new subscribers per month)
Cost: One-time sign up fee: $49.95. Weekdays, 6 p.m. - 5 a.m., weekends and holidays: $6.25 per hour. Any other time $20 per hour. (No minimum usage.) Features: Starting in 1983, Delphi is the youngest of the services and cannot yet match the user base or activity of the others. But it's a promising system with easy-to-use commands and menus. It offers an online encyclopedia, financial services, an electronic "flea market," and IN-OMANIA, a potpourri of user-written comments and stories. Delphi's electronic mail system lets you send correspondence to users of CompuServe and The Source.

The BBS Underground

If you live in or near a major city, there are probably more than a dozen BBS's (computer bulletin board systems) operating in a toll-free radius of your phone. Most BBS's are run privately by computer enthusiasts who serve as the board's SYSOP (or System Operator). Because of the volunteer staff, there is rarely any cost involved in using a BBS. BBS's are publicized either by rumor or by announcements in users' groups and computer periodicals. There are hundreds operating around the country, and new periodicals have sprung up to keep track of them.

At the very least, the BBS serves as a local message board, swap shop and "electronic flea market," and as a meeting ground for Special Interest Groups (or SIGs). Sometimes, professionals advertise their services or seek employees via the board; local merchants, especially in the computer field, use the boards to promote new products. A string of BBS's around the country, usually known as Dial-Your-Match, are dating—or, in some cases, sex—services. These require you to fill out a questionnaire and pay a fee for access to the system. There are many Atari-operated boards offering ready-to-run software written by other users. There's usually no charge for these programs, but you have to be running "smart" terminal software to be able to download them (receive them over the phone line and store them on tape or diskette).

For a current list of BBS's, ask at your local user group and where Atari products are sold. (Remember, telecomputing enables you talk to any computer.)

To use a BBS, connect your modem when you hear the high-pitched carrier tone. Then hit your [RETURN] key twice. The BBS will start sending you instructions on what to do next. If

you are asked for a password, don't panic. Simply type your name or any other easily remembered identifier. The system needs a password to keep track of messages left for you, for the SYSOP's convenience, and so on; there is generally no charge for the password as there is with commercial information services.

Knowledge Index

DIALOG Information Services
3460 Hillview Ave.
Palo Alto, CA 94304
Telephone: (800) 227-5510, or in California (415 858-3796
Subscribers: Information not available.

Cost: One-time sign up fee: $35 (includes two free hours to be used within 30 days). Mon. - Thurs., 6 p.m. - 5 a.m., Fri. 6 p.m. -midnight, Sat. 8 a.m. -midnight; Sun. 3 p.m. - 5 a.m. Monday morning. $24 per hour regardless of the database accessed. (No minimum usage. Service not available at any other time.)

Features: There are 12 distinct databases from Agriculture to Psychology, along with indexes to major newspapers and hundreds of magazines and periodicals. Articles are indexed back to 1979, about 1,000 articles are added daily.

Telecommunications Hardware and Software

Now that you're excited about telecomputing with your Atari, it's time to get down to the brass tacks. What kind of specific equipment and software do you need?

One of the very best buys in modems is the Atari 1030. It is a direct-connect modem that connects to your telephone line plug through a standard modular telephone jack. Your telephone is "daisy chained" from the modem to your telephone, with a standard modular jack. This feature allows the phone to remain connected to the 1030, even when the 1030 is not in use. You still can use the phone for standard functions like talking to someone — without disconnecting your modem.

The 1030 also features the built-in telecommunications program *Modemlink*, that is easy to use. Modemlink, features a clear, succinct, easy-to-read and understand command display. Modemlink even allows you to print incoming transmissions with your printer. And there's a memory buffer which stores incoming data through which you can scroll at will. The 1030 is a full duplex, 300 Baud (Bell 103-compatible) modem with settings for either originate or answer. It features pulse (rotary) and tone keyboard dialing; or you can dial manually.

The Atari 1030 with Modemlink is an excellent telecommunications package for those telecomputers who want an inexpensive and serviceable home system.

There are other telecommunications programs compatible with the Atari 1030 and other model Atari modems that greatly enhance their features by providing full upload and download capabilities. The following is a rundown of those programs, their key features, and availability.

Chameleon 4.0 is a popular terminal program in the public domain that has been greatly revised and expanded. It supports the Atari 1030 and 835 Modems and the Hayes Smartmodem in conjunction with the 850 Interface Module. And of course, it still supports the Atari 830 Modem and 850 Interface Module.

Chameleon is packed full of other features. One of the more valuable features is the XMODEM protocol, a routine long in the public domain that checks for errors in transmission. The program also includes Columbia University's Kermit file transfer protocol (widely used throughout the academic computing community), as well as Snapshot which allows you to download the previous nine screens plus your present screen to a storage device.

Another new addition is Chameleon's miniature disk management utility: You can copy, delete, lock and unlock files, as well as format diskettes and call up diskette directories—all without leaving Chameleon. There's even a phone-number directory (the numbers you enter are saved to diskette). Chameleon will subsequently auto-dial any number in the directory. Although Atari modems transmit at 300 Baud, Chameleon can move data bits at up to 9600 Baud. The screen size is 24 x 80 (or 132) columns, displaying 40 columns across at a time.

Although Chameleon is a very sophisticated, full-feature terminal emulation program, it is remarkably easy to use.

Disklink is another popular terminal program for Atari systems. It supports all the Atari modems, and features uploading and downloading, XMODEM,

auto-dial and auto-log on, and like Chameleon, a miniature DOS. Its menu windowing feature is unique. Menus come up as "windows" on the screen for ease of reference and use.

Disklink is a public domain program and there's a good chance your local Atari BBS may have it. It is also available through the Atari Special Interest Group on CompuServe.

AMODEM is one of the more popular public domain telecommunications programs for Atari Home Computer Systems. AMODEM features uploading and downloading to diskette or cassette, the XMODEM protocol, and variable baud rate (300, 600, or 1200). The program has two terminal modes: Atari and ASCII. In the Atari terminal mode, the 256 ATASCII characters display on your video screen in all their glory. When transmitting from one Atari Computer to another, the Atari terminal mode allows you to display control graphics characters and inverse video characters.

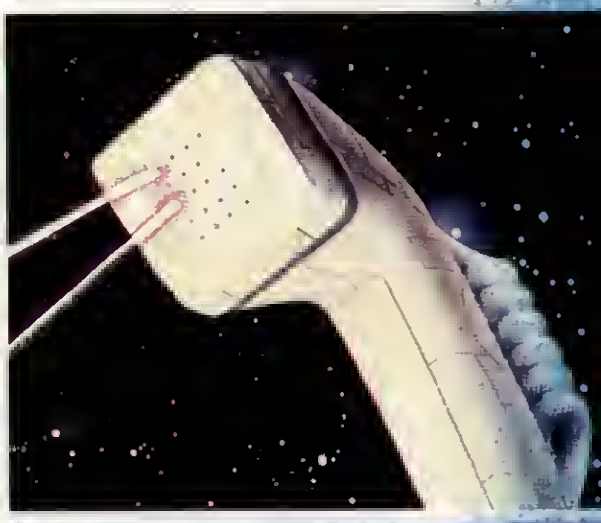
Since AMODEM is a public-domain terminal program, it's likely you'll be able to get a copy from your local Atari BBS. If not, you may obtain a copy of AMODEM 4.2 by writing to: Jim Steinbrecher, 37220 Tricia Drive, Sterling Heights, MI 48077. For a very reasonable fee, he'll be happy to send you the program on diskette. The cassette version is also very reasonable. He'll include brief documentation describing the program and how to use it. The program requires at least 24K RAM (32K is recommended) and ATARI BASIC.

A new version of AMODEM is available from the Atari Special Interest Group on CompuServe for downloading, or by mail.

TSCOPE is a terminal program available through CompuServe and was written to work with CompuServe. It features uploading, downloading, and word wraparound. It's easy to use with straightforward on-screen menus. If you use, or wish to use CompuServe regularly, it may be worth tracking this one down.

BRS/After Dark
Bibliographic Research Service
1200 Rt. 7
Latham, NY 12110
Telephone: (800) 833-4707, or in New York State (800) 553-5566. Canada, Alaska and Hawaii (call collect) at (518) 783-7251
Cost: One-time sign up fee: $50. Weekdays, 6 p.m. - 4 a.m., Sat. 6 a.m. - 4 a.m. Sunday morning; Sun. 6 a.m. - 2 p.m. and 7 p.m. - 4 a.m.: - $20 per hour, depending upon the database accessed. (Monthly minimum: $12.)

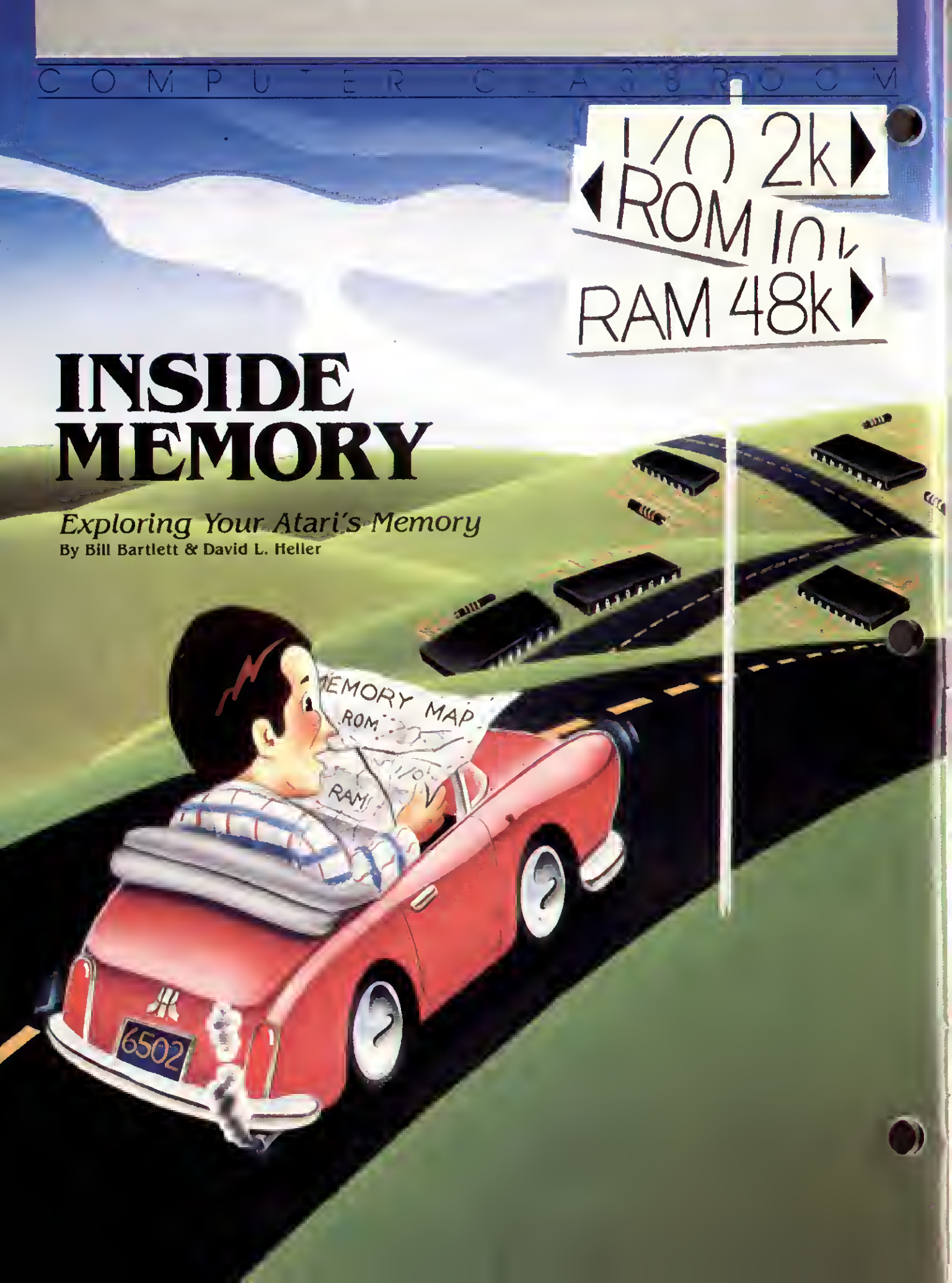
Features: There are 37 separate databases, including five that provide full-text (not just citations), such as The Harvard Business Review and the Academic American Encyclopedia. BRS/After Dark is particularly strong in medicine, health planning and education.



For more information about Atari telecomputing, you can get on-line with Cassie Stahl. On PLATO, leave a message for her (Cassie Stahl/ANTICS/pca). If you do not have a PLATO cartridge, you can reach her at Modem Magazine BBS, her personal bulletin board (408) 289-9151.

The Modem Magazine BBS has a special message base for Atari users and lots of useful software to download, including DISKLINK and TSCOPE.

COMPUTER CLASSROOM



INSIDE MEMORY

Exploring Your Atari's Memory

By Bill Bartlett & David L. Heller

If you read our last article, which explained the infamous, but much used hexadecimal numbering system, you're all set to explore the inner workings of your Atari computer—its memory and the memory map.

The 6502 Microprocessor

The 6502 microprocessor, a small computer on a chip, is the heart of your Atari computer. It contains Random Access Memory (RAM), a workspace where your computer stores and retrieves values on a temporary basis and Read Only Memory (ROM), a permanent storage area containing tables of data or predefined routines that the 6502 uses to perform calculations and to communicate with you and with input/output (I/O) chips that control peripherals like the disk drive and printer.

Because the 6502 can only manipulate 64K (65,536) bytes of information, all the RAM, ROM and I/O resources are carefully organized, charted on a memory map, and packed into this tight confine. After we take a closer look at RAM, ROM and the I/O chips, we'll take a journey through the Atari computer's memory map so you can wander around inside the 6502 without bumping into obstacles or getting lost. You'll discover what parts of memory are used by your Atari computer, what parts are free for your use, and what memory locations put you in control of your computer. So, lets get started!

A Close Look at RAM

Random Access Memory (RAM) can store and retrieve values on a temporary basis. When you write a program, it is stored in RAM until you replace it with another program, or turn off the power.

Looking Into ROM

Read Only Memory (ROM) is permanent storage that stores *data tables* and *routines* that the 6502 needs every time the power is turned on.

One example of a ROM *data table* is the character set—the letters, numbers and symbols that appear on your screen when you press the keyboard. These characters are built into the ROM of your Atari computer in a 1K (1024) byte table that defines the shape of each character.

A good example of a ROM *routine* is the floating point package. This routine occupies 2K (2,048) bytes of memory and turns your Atari computer into a sophisticated calculator by providing extended arithmetic functions like multiplication, division, logarithms and exponentiation.

Those Four Input/Output Chips

ANTIC, GTIA, POKEY and PIA are the names of the four support chips that extend the power of the 6502 main processor. The ANTIC and GTIA chips work as a team and contain many individual memory locations, called registers, that define the color, shape and location of objects that appear on your TV or monitor's screen. The POKEY chip is responsible for four-channel sound generation, reading the keyboard, and communicating with all the serial peripheral devices such as the disk drive, printer or modem. The PIA chip takes care of joystick port inputs.

Your Computer's Memory Map

Now that you have a general idea of the Atari Computer's internal organization, let's move on to the specifics.

Atari 400

The typical Atari 400 Computer is equipped with 10K of ROM used by the operating system, 2K of I/O chips, and 16K of RAM. When a cartridge is installed, another 8K or 16K of ROM is brought into use. By adding all these numbers together, you'll see that the Atari 400 can use up to 44K memory.

Illustrated by JOHN BLANCHARD

Atari 800

The Atari 800 computer typically comes equipped with 10K of ROM for the operating system, 2K of I/O chips, and 48K of RAM. That's 60K of usable memory out of a possible 64K because a 4K block of memory is reserved for future expansion. When you install a cartridge into your Atari 800, another 8K or 16K of ROM is brought on-line. To make room for this additional ROM (within the computer's 64K limitation) an equivalent amount of RAM is disabled. So, with an ATARI BASIC cartridge installed, the memory allocation becomes 10K of Operating System ROM, 8K of BASIC ROM., 2K for the I/O chips, and 40K of RAM for a total of 60K.

Atari 1200XL

The Atari 1200XL computer comes equipped with a 14K Operating System ROM because it uses the 4K block of memory that was reserved for expansion in the Atari 800. It also contains 2K of ROM for the self-test feature, 2K of I/O chips, and 64K of RAM. If you add all this together, you'll find that the memory usage equals 82K. This exceeds the 64K limitation! How does it do it?

No problem. The 1200XL computer includes a special memory manager chip that switches between the Operating System, self-test ROM, and RAM. This hard-working chip that makes sure the apparent memory allocation for a 1200XL without a cartridge is 14K for the Operating System, 2K of I/O chips, and 48K of RAM for a total of 64K.

When a cartridge is installed, another 8K or 16K of ROM is present, and an equivalent amount of RAM is disabled, just like the Atari 800!

Atari 600XL

The Atari 600XL computer is equipped with 14K of Operating System ROM, 8K of ROM for its built-in ATARI BASIC, 2K of ROM for its self-test feature, 2K of I/O chips, and 16K of RAM. When you install a cartridge, 8K or 16K of ROM is present, and replaces the built-in BASIC. At most, 50K of memory is utilized.

Atari 800XL

This new workhorse of the Atari computer line comes equipped with 14K of Operating System ROM, 8K of ROM for its built-in ATARI BASIC, 2K of ROM for the self-test feature, 2K of I/O chips, and 64K of RAM. That's 90K of memory usage! Well above the 64K limit! But like the 1200XL, the Atari 800XL contains a memory manager that takes care of this disparity. With its built-in BASIC enabled, the 800XL's memory allocation breaks down like this: 14K Operating System ROM, 8K BASIC ROM, 2K of I/O chips, and 40K of RAM, for a total of 64K.

When you disable the built-in BASIC by holding down the [OPTION] key when you turn on the computer, the memory allocation breaks down like this: 14K Operating System ROM, 2K of I/O chips, and 48K of RAM for a total of 64K. When you invoke the Atari 800XL's self-test feature, the memory allocation becomes: 2K of self-test ROM, 14K Operating System ROM, and 48K of RAM, for a total of 64K.

The Atari Computer Memory Map

Here it is, the Memory Map you've all been waiting for. It applies to an 800XL computer with DOS 2.05, RS232 (850 Interface), and ATARI BASIC booted in graphics mode 0.

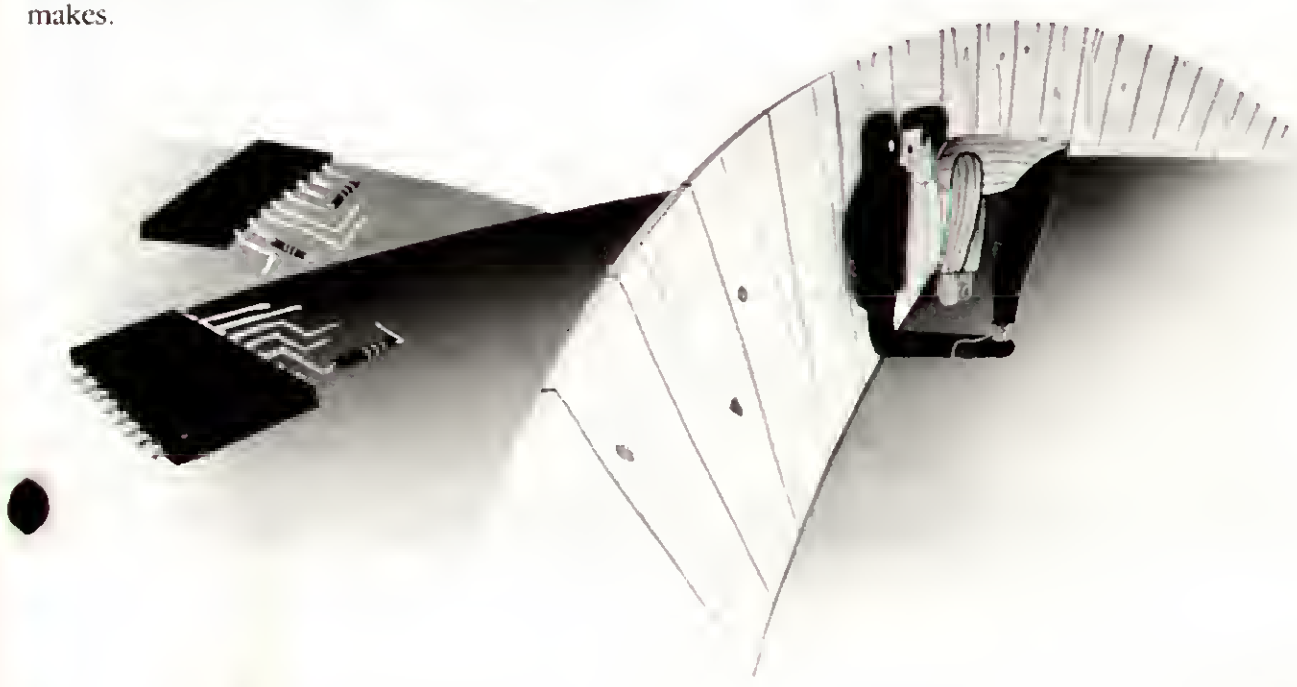
Memory Location		USE
Decimal	Hexidecimal	
0-1535	$0000-05FF	RAM workspace for the operating system.
1536-1791	$0600-06FF	RAM workspace for the user (Page 6).
1792-7419	$0700-1CFB	RAM workspace for DOS (D: device).
7420-9181	$1CFC-23DD	RAM workspace for RS232 (R: device).
9182-39967	$23DE-9C1F	RAM workspace for BASIC programs. If the 850 is not booted, BASIC RAM starts at $1CFC. If DOS is not booted, BASIC RAM starts at $0700.
39968-40959	$9C20-9FFF	RAM for the display list and screen text.
40960-49151	$A000-BFFF	Atari BASIC ROM.
49152-52223	$C000-CBFF	XL OS ROM.
52224-53247	$CC00-CFFF	XL OS ROM (international character set).
53248-53503	$D000-D0FF	GTIA registers.
53504-53759	$D100-D1FF	Reserved for future use.
53760-54015	$D200-D2FF	POKEY registers.
54016-54271	$D300-D3FF	PIA registers.
54272-54527	$D400-D4FF	ANTIC registers
54528-55295	$D500-D7FF	Reserved for future use.
55296-57343	$D800-DFFF	OS ROM (Floating point math package).
57344-58367	$E000-E3FF	OS ROM (Domestic character set).
58368-65535	$E400-FFFF	OS ROM.

Looking Into ROM

```
10 REM MEMORY DEMO
20 POKE 764,255:POKE 580,1
30 GRAPHICS 0:POKE 752,1:POKE 710,0:?
:? :? CHR$(127);CHR$(127);"OFFSET: 0":
? :? :? :FOR X=0 TO 1023
40 ? CHR$(127);CHR$(127);57344+X;CHR$(
127);PEEK(57344+X)
50 IF INT((X+1)/8)=(X+1)/8 THEN POSITI
ON 4,18:? "PRESS START TO FLIP THROUGH
 MEMORY":GOSUB 90
60 IF X+1>=1024 THEN X=0:GOTO 30
70 NEXT X
80 STOP
90 IF PEEK(53279)<>6 THEN GOTO 90
100 GRAPHICS 0:POKE 77,0:POKE 710,0:PO
KE 752,1
110 ? :? :? CHR$(127);CHR$(127);"OFFSE
T: ";X+1
120 IF X>0 AND X<505 THEN OFF=X/8:AT=O
FF+32:? CHR$(127);CHR$(127);"CHARACTER
: ";CHR$(AT):? :? :?
130 IF X>=505 AND X<761 THEN OFF=(X+1)
/8:AT=OFF-64:? CHR$(127);CHR$(127);"CH
ARACTER: ";CHR$(AT):? :? :?
140 IF X>=761 AND X<1023 THEN AT=X/8:?
 CHR$(127);CHR$(127);"CHARACTER: ";CHR
$(AT):? :? :?
150 RETURN
```

PEEKing Into a Memory Location

Now that you know where everything is, here's a short program for all model Atari computers. It PEEKs into locations 57344-58367 (Domestic character set), displays the values stored in each location, the offset from the beginning of the character set, and the character that each set of eight numbers makes.



MANAGING THE ATARI LOGO WORKSPACE

by Jason Gervich

Atari Logo is charming, challenging, engaging, but occasionally frustrating. This Workspace Management Program (WMP) is designed to ease the frustration by providing some powerful procedures for managing the Atari Logo workspace. Some of the procedures make using Atari Logo easier, while others give you greater control over the manipulation of procedures in the workspace.

WMP: What it Does

Essentially, the WMP allows the Logo user to select which procedures to put where and in what order. Without WMP, your ability to work with procedures is restricted: you can save all of them to a disk or printer, but you can't control the sequence and you can save only selected ones.

For example, you may have five procedures in your workspace. Two of them facilitate drawing a flower and the other three are for a number game. With standard Atari Logo, you can't save the two groups separately. But with WMP, you can save the two groups easily in different files, calling one FLOWER and the other NUMGAME.

Not only can you manipulate subgroups of procedures, you can determine their sequence when saving them to the printer, disk or cassette. This is especially important when printing the listings for study or debugging.

Besides selecting and sequencing procedures, WMP saves typing quote marks ("), ([ ]) and colons (:) when loading, saving, editing and erasing procedures. For example, to get a listing of all the files on a disk, in standard Atari Logo you must type, CATALOG "D:. With WMP you merely type C.

WMP also makes the workspace a little friendlier. When using any of the WMP commands that involve editing, saving, etc., a list of procedures currently in the workspace appears. And prompts appear to tell you that your procedures are being saved to the disk or printer, both before and after they are saved. This improves on the standard Logo "?" which does not convey an abundance of information to Logo novices.

Using WMP

Start up your Atari Computer with the Logo cartridge and a formatted disk. (The program can also be saved to cassette with a few modifications.) Type in the WMP procedures exactly as they are printed. Then save them with the filename "D:WMP" on at least two separate disks (one for a backup).

Now each time you start up Logo, you can load WMP into your workspace. Then, type M and press [RETURN]. (RETURN is always used to execute a Logo command so I will stop reminding you of it for the rest of this article). You will now see a menu listing all the WMP procedure names and their functions.

A catalog of the disk contents is accessed by typing C. To edit procedures, simply type E for a list of all procedures in your workspace. Then type in the names of the one you want to edit. You don't need the " or [ ] as you do in standard Logo. To load or save procedures, just type L or S and the name of the file to be loaded.

EW (Erase WMP) will erase all the WMP procedures. You may want to use this if you need more room in your workspace. EP (Erase Procedures) will alow you to erase selected ones from your workspace.

The last two procedures, SP and SW, are the most complex and probably the most useful. SP (Save Procedures) allows you flexibility in manipulating the procedures in your workspace. You can select whicb ones you want to save, the order in which they are saved, and the device (printer or disk) that you want to save them to. This is a hig improvement over standard Logo where you can save only the entire workspace without control over the sequence.

The prompt "Procedures to Save?" will show you a list of all the procedures. If you have more than will fit on the screen at one time, press the [CTRL]-1 keys to stop and start the screen display. Then type in the names of the ones you want to save. The procedures will be saved to the printer or the disk in the order that you type them.

The last procedure, SW (Save Workspace) saves all the procedures in the workspace to the printer or disk. In addition, you can save your workspace with or without the WMP procedures and/or any global variables that have heen created.

How the Program Works

In designing these procedures for Atari Logo, I encountered problems that affected the way they were written. One was the absence of the Logo primitive LOCAL, which allows you to make any variable local from within a procedure. This means tbat when the procedure stops running, the variable does not exist anymore. LOCAL prevents cluttering the workspace with a lot of variable names.

I duplicated the LOCAL function by erasing any variable created by the WMP at the end of each procedure. All the procedures except M and C allow you to exit if you change your mind and don't want to use the procedure. And, any variables created up to the exit point also had to he erased.

For example, the L procedure contains these lines:

```
MAKE "FILENAME RL
IF [ ]= :FILENAME [ERN "FILENAME STOP]
```

This calls for a filename to load. If you change your mind and press [RETURN] to exit, then the variable "FILENAME contains tbe empty list represented by the brackets ([ ]). If "FILENAME contains the empty list ([ ]), Logo carries out the instructions inside the brackets [ERN "FILENAME STOP]. Here the variable "FILENAME would he erased and the procedure stops. If you enter a filename after the statement MAKE "FILENAME RL, the program would ignore the IF [ ]= line and complete the procedure. Then at the end, the variable "FILENAME is erased with the ERN primitive, tbus keeping the workspace free of unwanted variable names.

Another prohlem I encountered had to do with form and style. Procedures SP and SW are more complex and would benefit by being divided into subprocedures. I did not break them up because the workspace would hecome too cluttered when listing POTS, as many of the WMP procedures do. The WMP program already adds eigbt procedure titles to the workspace. Had Atari Logo contained tbe BURY primitive, all tbe WMP procedures could have been burried when loaded into the workspace, and the SW and SP procedures could have been written with their proper subprocedures.

Programming Notes

In the SW and SP procedures, the SETREAD and SETWRITE primitives were used to open "drihhle" files to the disk and printer. But instead of sending

"dribble," POPS and POTS, etc. were sent to the specified device. This undocumented use of SETREAD and SETWRITE formed the essence of the WMP. In conjunction with SETREAD and SETWRITE, the .DEPOSIT primitive (the Logo equivalent of the BASIC "POKE") was used to blank the screen and speed up the savings process. .DEPOSIT 559 0 was used to blank the screen and .DEPOSIT 559 58 turned it back on again.

Memory Requirements

The WMP requires an Atari computer with a minimum of 32K RAM. WMP takes up about 1,074 nodes, or 5.4K or RAM, leaving you with 12.5K for your workspace after both WMO and DOS are loaded. If you find that you need more than the 12.5K workspace, you can save the WMP procedures in individual files and load them into the workspace as needed.

Summary

I think that you will find the WMP to be a powerful, easy-to-use tool that greatly enhances working with Atari Logo. The WMP also provides an excellent example of the extensibility of Logo. With Logo you can create procedures that behave just like Logo primitives. And the fact that Logo can create processes that make working with Logo easier, begins to take us beyond mere programming and into the realms of philosophy and science. And that, really, is what Logo is all about.

```
TO M
CT
SETCURSOR [13 0] PR [ WMP MENU ]
SETCURSOR [6 3] PR ( SE [] [C )] [] [C
atalog] )
SETCURSOR [6 4] PR ( SE [] [E )] [] [E
dit] )
SETCURSOR [6 5] PR ( SE [] [L )] [] [L
oad] )
SETCURSOR [6 6] PR ( SE [] [M )] [] [M
enu] )
SETCURSOR [6 7] PR ( SE [] [EW )] [] [
Erase WMP] )
SETCURSOR [6 8] PR ( SE [] [EP )] [] [
Erase Procedures] )
SETCURSOR [6 9] PR ( SE [] [SP )] [] [
Save Procedures] )
SETCURSOR [6 10] PR ( SE [] [SW )] []
[Save Workspace] )
PR []
TYPE [>]
RUN RL
END

TO C
CATALOG "D:
END

TO E
CT
PR [Procedures to Edit?]
PR [] POTS
PR []
TYPE [>]
MAKE "PROCS RL
IF [] = :PROCS [ERN "PROCS STOP]
ED :PROCS
ERN "PROCS
END

TO L
PR [Filename to Load?]
TYPE [>]
MAKE "FILENAME RL
IF [] = :FILENAME [ERN "FILENAME STOP]
LOAD WORD "D: FIRST :FILENAME
ERN "FILENAME
END

TO EW
CT
PR [Erase all WMP Procedures? ( Y / N
)]
PR []
TYPE [>]
MAKE "ERWMP RL
IF [] = :ERWMP [ERN "ERWMP STOP]
IF EQUALP :ERWMP [Y] [ER [SW EW L E C
M EP SP]]
ERN "ERWMP
END
```

```
TO EP
CT
PR [Procedures to Erase?]
PR [] POTS
PR []
TYPE [>]
MAKE "PROCS RL
IF [] = :PROCS [ERN "PROCS STOP]
PR ( SE [ERASE] [<] :PROCS [>] )
PR [ARE YOU SURE? ( Y / N )]
MAKE "ERPROCS RC
IF EQUALP :ERPROCS "Y [ERASE :PROCS]
ERN [PROCS ERPROCS]
END

WAIT 60
CT .DEPOSIT 559 0
IF EQUALP :SVAR "Y [ERN [DEVICE FILENA
ME SWMP SVAR] POALL] [POPS]
SETWRITE []
CT .DEPOSIT 559 58
SETCURSOR [10 8]
PR [ WORKSPACE SAVED ]
ERN [DEVICE FILENAME SVAR SWMP]
END

TO SP
CT
PR [Procedures to Save?]
PR [] POTS
PR []
TYPE [>]
MAKE "PROCS RL
PR [Save to Printer or Disk? ( P / D )
]
MAKE "DEV RL
IF [] = :DEV [ERN [PROCS DEV] STOP]
IF EQUALP FIRST :DEV "D [PR [Save as W
hat Filename?] MAKE "FILENAME RL]
IF EQUALP FIRST :DEV "D [CT SETCURSOR
[4 8] PR [ SAVING PROCEDURES TO DISK ]
 SETWRITE WORD "D: FIRST :FILENAME]
IF EQUALP FIRST :DEV "P [CT SETCURSOR
[4 8] PR [ SAVING PROCEDURES TO PRINTE
R ] SETWRITE "P:]
WAIT 60 CT
.DEPOSIT 559 0
PO :PROCS
SETWRITE []
CT .DEPOSIT 559 58
CT SETCURSOR [10 8]
PR [ PROCEDURES SAVED ]
ERN [PROCS FILENAME DEV]
END

TO SW
CT PR [Save Workspace] PR []
PONS PR []
PR [Save With Variables? ( Y / N )]
MAKE "SVAR FIRST RL
PR [Save with WMP? ( Y / N )]
MAKE "SWMP FIRST RL
IF EQUALP FIRST :SWMP "N [ER [EW SW L
E C M EP SP]]
PR [Printer or Disk? ( D / P )]
MAKE "DEVICE RL
IF [] = :DEVICE [ERN SVAR SWMP DEVICE
STOP]
IF EQUALP FIRST :DEVICE "P [CT SETCURS
OR [4 8] PR [ SAVING WORKSPACE TO PRIN
TER ] SETWRITE "P:]
IF EQUALP FIRST :DEVICE "D [PR [Filena
me?] MAKE "FILENAME RL]
IF EQUALP FIRST :DEVICE "D [CT SETCURS
OR [4 8] PR [ SAVING WORKSPACE TO DISK
 ] SETWRITE WORD "D: FIRST :FILENAME]
WAIT 60
CT .DEPOSIT 559 0
```

BITS & PIECES

By David L. Heller

Life does indeed begin at 10,958, days that is. Which is to say that life and programming begin at 30. This edition of Bits & Pieces features three programs that were contributed by young men over the age of thirty . . . gasp!

In this issue you'll learn how to turn your Atari into a typewriter; a spelling quizzer that talks back; a meticulous counter of days; and a time machine!

So sit down in front of your computer, make yourself comfortable, poise your fingertips over the keyboard and get set for some real excitement!

Submitting a Program or Subroutine to BITS AND PIECES

To prepare a program or subroutine for submission to *Bits and Pieces* follow these guidelines:

1. Give your program or subroutine a name of eight or less characters.

2. Write a brief description of the task performed by your program or subroutine and describe any special features.

3. Write a few lines about yourself and how you came to develop your program or subroutine.

4. If you are a more experienced programmer submitting a subroutine, then compile the following important information:

- List the variables for which you need values when calling the subroutine (entry variables).
- List all DIMensioned variables with their sizes.
- List any IOCBs used in OPEN statements.
- List the variables which may be generated by the subroutine and passed back to the main program (exit variables).

5. Send a copy of your program on cassette or diskette, attach a printed listing of your program or subroutine, and mail to:

Bits and Pieces
c/o ATARI EXPLORER
1265 Borregas Ave.
Sunnyvale, CA 94086

Even if you don't consider yourself an "expert" or "advanced" programmer, don't be discouraged! If you have created something neat or interesting, submit your program and explain its operation to the best of your ability. "Bits and Pieces" is for experts and beginners alike. So don't be shy. Even novices develop programs and routines that are of interest to others!

PAGE WRITER

An Atari Typewriter

By John R. Powell

John Powell, a thirty-four-year-old electronics expert who works at Cerritos Community College in Norwalk, California, does a lot of corresponding. And, he does it all with his Atari 400 computer, a Program Recorder and an Atari 1025 dot matrix printer.

How is this possible? Simple. His PAGE WRITER program makes writing a snap; it works with any Atari-compatible 80-column printer and either a disk drive or Program Recorder. So after you have typed in and saved the PAGE WRITER program, RUN it and write that letter you've been putting off.

John's program is loaded with elegant, but simple options. First you'll be asked whether you are using fanfold or single-sheet paper. Then, the program asks whether you'd like your prose printed out single or double-spaced. Once this is sorted out, the going is easy.

You enter one line at a time, guided by a series of dashes displayed across your screen that keep the printout uniform. There's even a marker on the screen that makes it easy for you to center words for reports or fancy headlines. A handy line counter also appears on the screen to tell you how many more lines you can type before reaching the bottom of each sheet of paper.

All and all, John Powell's PAGE WRITER is short, sweet and simple.

```
10 REM PAGEWRITE VERSION 1.0
20 REM COPYRIGHT 1984 BY JOHN R. POWEL
L
30 GRAPHICS 0:? CHR$(125):DIM L$(80),Q
$(1),S$(1):L=0
40 ? :? "Copyright 1984 by John. R. Po
well"
50 ? :? :? ,"Pagewriter"
60 ? :? :?
70 ? :? "Enter 1 for single sheet pape
r, or 2  for fan-fold/roll paper. ":IN
PUT Q
80 ? :? "Enter 'S' for single-spacing,
 or 'D' for double-spacing.":INPUT S$
90 ? CHR$(125):? :? "Left margin is fi
xed at 7 spaces in."
100 ? :? "Line length can't exceed 66
characters"
110 ? :? "Write each line at '?' mark.
  Number  on right indicates lines lef
t."
120 ? :? "To double-space between para
graphs,   press RETURN, once ONLY."
130 ? :? "Dashes represent maximum lin
e         length, ':' represents middl
e of page."
140 ? :? "Position print head near top
 of page.":? :? "Press START to begin.
"
150 IF PEEK(53279)<>6 THEN GOTO 150
160 ? CHR$(125)
170 IF Q=1 THEN L=46:GOTO 190:REM LINE
 MAX SINGLE
180 L=58:REM LINE MAX FAN/ROLL
190 IF S$="S" THEN L=L-1:GOTO 210:REM
SINGLE SPACE
200 L=L-2:REM DOUBLE SPACE
210 ? :? "ENTER TEXT";:? ,L;" lines to
 go.":IF L<0 THEN 270
220 ? :? "----------------------------
----:-------------------------------"
230 INPUT L$:REM LIN IN
240 LPRINT "       ";L$:REM L MARGIN I
NDENT & LINE PRINT
250 IF S$="D" THEN LPRINT
260 GOTO 190
270 ? CHR$(125):? :? :? "END OF ROUTIN
E"
280 ? :? "Do you wish to print another
 page    (Y/N)";:INPUT Q$
290 IF Q$="Y" OR Q$="y" THEN 310
300 END
310 ? CHR$(125):? :? "If necessary, in
sert a new sheet or     advance the pa
per."
320 GOTO 140
```

The Spelling Quiz That Talks Back!

By Lou Carpenter

Lou Carpenter, a computer analyst who "claims" to be only 39, got the inspiration for his SPELLBEE program from a Bits & Pieces article about Program Recorder control, and from his daughter, who asked her dad for fifth-grade spelling help.

If you've got a Program Recorder, any model Atari computer, and would like to improve your spelling prowess, SPELLBEE can provide the answer.

The SPELLBEE program asks prerecorded spelling questions through your TV's speaker and waits for an answer to be typed in. You'll have to do a bit of recording, so get your microphone ready, clear your throat and we'll get started.

First, enter the SPELLBEE program and save it to your Program Recorder on a cassette tape using the CSAVE command.

Here's the program. After you've got it neatly tucked away on tape, I'll give you a simple script to record on the reverse side of the tape, and show you some programming tips.

```
10 REM ** SPELLBEE **
20 DIM X$(40),A$(40)
30 MOTOR=54018:GO=52:HALT=60
40 KEYBOARD=764:NOKEY=255
50 GRAPHICS 0:?
60 ? "INSERT AUDIO CASSETTE INTO RECOR
DER."
70 ? "REWIND IT TO THE BEGINNING."
80 ? :? "PRESS PLAY ON THE RECORDER."
90 ? " HIT RETURN WHEN TAPE IS READY."
100 POKE KEYBOARD,NOKEY
110 IF PEEK(KEYBOARD)=NOKEY THEN 110
120 NQ=0:NR=0:RESTORE
130 READ A$:IF A$="***" THEN 310
140 GRAPHICS 0:? :NQ=NQ+1
150 POKE KEYBOARD,NOKEY
160 POKE MOTOR,GO
170 ? "PRESS SPACE BAR TO STOP TAPE."
180 IF PEEK(KEYBOARD)=NOKEY THEN 180
190 POKE MOTOR,HALT
200 POKE KEYBOARD,NOKEY
210 ? :? "YOUR ANSWER";:INPUT X$
220 IF LEN(X$)=0 THEN GRAPHICS 0:? :GO
TO 210
230 IF A$=X$ THEN 290
240 ? :? "SORRY!":? "THE CORRECT ANSWE
R IS ";A$
250 ? :? "PLEASE TYPE IN THE CORRECT A
NSWER NOW":INPUT X$
260 IF LEN(X$)=0 THEN 250
270 IF A$=X$ THEN 130
280 GOTO 240
290 NR=NR+1:? :? "CORRECT!"
300 FOR W=1 TO 200:NEXT W:GOTO 130
310 IF NR=NQ THEN 340
320 ? :? "YOU GOT ";NR;" OUT OF ";NQ;"
 WORDS RIGHT."
330 GOTO 360
340 ? :? "CONGRATULATIONS!"
350 ? "YOU GOT ALL ";NQ;" WORDS RIGHT!
"
360 ? :? "DO YOU WANT TO TRY AGAIN";
370 INPUT X$
380 IF X$(1,1)="Y" THEN 420
390 IF X$(1,1)<>"N" THEN ? "WHAT";:GOT
O 370
400 ? :? "OK...BUT PLEASE TAKE OUT YOU
R TAPE BE-FORE LEAVING.":? ".....GOODB
YE!"
410 END
420 GRAPHICS 0:? :? "PRESS STOP ON THE
 RECORDER.":GOTO 70
430 DATA GAUDY
440 DATA OFFBEAT
450 DATA DAWNED
460 DATA WALTZ
470 DATA SCRAWL
480 DATA CAUSEWAY
490 DATA AUGER
500 DATA JAUNTY
510 DATA SOUGHT
520 DATA VAULT
530 DATA ***
```

Now that you've got SPELLBEE typed in and saved, label the program side of the tape, remove it from your Program Recorder and plug in your stereo tape recorder. It's time to record the spelling questions (in stereo) on the flip-side of the program tape.

All set? OK, rewind the tape, warm up your voice, get out your microphone and start talking. Here's the script, I've used a hyphen (-) between words to indicate a pause:

"Spell each of the following words after I pronounce them. Press the space bar to stop the tape, then enter your answer and press RETURN after each one."

"Here we go! Gaudy - Offbeat - Dawned - Waltz - Scrawl - Causeway - Jaunty - Sought - Vault -The end."

To add or change words, just add to or modify the DATA statements at the end of the program. The last line of data must contain three asterisks, like this:

DATA ***

Remember to make your recording match up with your new words!

Use the CLOAD command to load SPELLBEE. Operating instructions are built right into the program so you can immediately improve your spelling after you turn up the volume on your TV set!

WORDDATE

By Bobby Pritchett

Now I know why I feel so tired. I'm over 15,000 days old! What a shock! And, this revelation was made possible with a little help from Bobby Pritchett's WORDDATE program.

WORDDATE asks for two dates in "mmddyy" format, then calculates the number of days between the two dates, (including leap years for the entire twentieth century.)

Bobby's program opens up all sorts of possibilities. Besides figuring out how many days-old you are, you might want to use WORDDATE as the basis for a bio-rhythm program, or you could simply use it to calculate how many days are left until Christmas or your vacation. Whatever the use, I'm sure you'll enjoy this original program.

By the way, Bobby Pritchett is a 13,149-day-old bank vice-president who takes his Atari computer very seriously. He told me that "the Atari Computer is a really powerful machine." He uses his 800 for several bank applications, to maintain his country club's tournament mailing list, and for a variety of family-oriented uses.

How Many Days Old Are You?

```
10 REM WORDDATE by Bobby Pritchett
20 REM CALCULATES THE # OF DAYS BETWEE
N 2 DATES IN THE 20TH CENTURY INCLUDIN
G LEAP DAYS.
30 SETCOLOR 2,2,2:SETCOLOR 1,2,10
40 DIM FDATE$(6),SDATE$(6),A$(10)
50 ? CHR$(125)
60 ? "ENTER BEGINNING DATE (MMDDYY):";
70 INPUT FDATE$
80 DIM FMO$(2),FDY$(2),FYR$(2),SMO$(2)
,SDY$(2),SYR$(2)
90 FMO$=FDATE$(1,2):FDY$=FDATE$(3,4):F
YR$=FDATE$(5,6)
100 A=VAL(FMO$)
110 ON A GOSUB 310,320,330,340,350,360
,370,380,390,400,410,420
120 B=VAL(FDY$)*1
130 ? A$;" ";B;", 19";FYR$
140 ? "ENTER ENDING DATE (MMDDYY):";
150 INPUT SDATE$
160 SMO$=SDATE$(1,2):SDY$=SDATE$(3,4):
SYR$=SDATE$(5,6)
170 C=VAL(SMO$)
180 ON C GOSUB 310,320,330,340,350,360
,370,380,390,400,410,420
190 D=VAL(SDY$)*1
200 ? A$;" ";D;", 19";SYR$
210 E=VAL(FMO$):F=VAL(FDY$):G=VAL(FYR$
):H=VAL(SMO$):I=VAL(SDY$):J=VAL(SYR$)
220 IF E=H AND G=J THEN 590
230 ON E GOSUB 430,440,490,500,510,520
,530,540,550,560,570,580
240 E=E+1
250 IF E>12 THEN G=G+1
260 IF E>12 THEN E=1
270 IF G<J THEN GOTO 300
280 IF E<H THEN GOTO 300
290 GOTO 590
300 GOTO 230
310 A$="JANUARY":RETURN
320 A$="FEBRUARY":RETURN
330 A$="MARCH":RETURN
340 A$="APRIL":RETURN
350 A$="MAY":RETURN
360 A$="JUNE":RETURN
370 A$="JULY":RETURN
380 A$="AUGUST":RETURN
390 A$="SEPTEMBER":RETURN
400 A$="OCTOBER":RETURN
410 A$="NOVEMBER":RETURN
420 A$="DECEMBER":RETURN
430 O=O+31:RETURN
440 O=O+28
450 P=G/4
460 Q=INT(P)
470 IF P-Q=0 THEN O=O+1
480 RETURN
490 O=O+31:RETURN
500 O=O+30:RETURN
510 O=O+31:RETURN
520 O=O+30:RETURN
530 O=O+31:RETURN
540 O=O+31:RETURN
550 O=O+30:RETURN
560 O=O+31:RETURN
570 O=O+30:RETURN
580 O=O+31:RETURN
590 O=O+I-F
600 ? "TERM IN DAYS - ";O
610 END
```

KINETIC GRAPHIC ART

by Neil Harris

The ***Kinetic Art*** program below is a collection of graphic goodies that create ever-changing computer-controlled abstract patterns. This is a different approach to art than usual CAD (Computer-Aided Design) programs that make the computer a tool in the hands of an artist. I'm not an artist, but I can program. I select the concept, the computer creates the display. ***Kinetic Art*** is the best of both possible worlds for those of us who don't know how to draw.

You will rarely see the same picture twice. The shapes are governed by the computer's random number generator. The random numbers are under strict rules, so the shapes don't just form blobs and squiggles but make more pleasing images. For instance, the ***Celestial Spheres*** section draws ovals whose height, width, and color are selected at random. The ***String Art*** section draws lines whose endpoints are moving randomly, with the coordinates changing by up to 3 pixels in any direction. Tight control over the range of random numbers in each formula gives each picture its unique look.

This program is also good for keeping the computer busy when it has nothing else to do; idle bits are the devil's workshop!

A menu of five pattern choices will appear on your screen after you run ***Kinetic Art***. Just press the number next the pattern selection, enter a graphics mode (3 to 11, and 14 and 15, press RETURN, and watch the patterns form on your screen. You'll have to press the BREAK key and type RUN to restart the program.

Most of the kinetic patterns look best in the higher resolution modes with colors, but I refuse to make any artistic judgements.

The first two patterns are similar, drawing ragged ovals in different colors.

1. Celestial Spheres

Celestial Spheres uses the center of the screen as a common center for all ovals. Each new oval overlaps the preceding ones. Openings in the ovals show a variety of random colors. As time passes, the display becomes more and more interesting, almost like a light show. ***Celestial Spheres*** looks best in the more colorful modes, especially 7, 9, 10, and 15.

2. Reflected Spheres

Reflected Spheres divides the screen into four quarters that are symmetrical to the center of the

screen. It draws the oval patern, and also creates four copies of the image in the quadrants of the screen. This display is more dramatic, especially in the multi-color modes.

3. Squirals

The third pattern is called ***Squirals,*** for "square spirals." This program is simpler to write in LOGO than in BASIC, without the benefit of turtle graphics. ***Squirals*** works well in mode 8 with the sharpest resolution. The values picked in line 500 affect the size of the line and the angle of the drawings. You can modify this program if you want to create exciting screen effects. The easiest way to modify lines and angles is to add a new line 505 to change the angle's value. Here are some suggestions:

505 L = 90
505 L = 91
505 L = 60
505 L = 140
505 L = 75
505 L = 175
505 L = 135

4. String Art

The fourth image is called ***String Art.*** A line floats around the screen, changing colors as it bounces off the edge of the screen. ***String Art*** forms a colorful trail by leaving the 50 most recent lines on the screen while erasing all previous lines. The coordinates of the lines are stored in an array to make it simpler to erase previous lines. Again, the higher resolution modes, with lots of colors, work best here.

5. Light Show

The final pattern is the ***Light Show*** from the Atari BASIC Reference Manual, modified to include a random center point on the screen. The jagged lines form an interesting moire pattern. Mode B works well for this one.

BASIC Programmers Take Note

The program listing is easy to follow if you're experienced in BASIC. Lines 10 to 110 contain the "menu routine" that lets you pick your pattern, graphic mode, and checks for typing errors.

Lines 140 to 220 form the first pattern; 300 to 430 form the second; 500 to 560 the third; 700 to 850 the fourth; and 900 to 990 contain the final image.

Array G holds the width, height, and number of colors for the different graphics modes. This array enables the program to easily handle the transition between graphics modes.

Array A holds the old lines in the ***String Art*** section. A pointer, called "X" keeps track of lines. First the old line is erased, then the values in the A array are replaced with those for the newest line. This program cleans up after itself!

Express Your Artistic Creativity

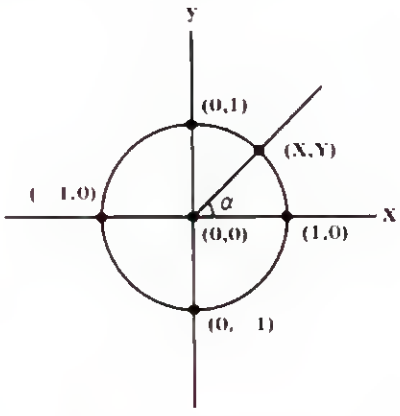
Feel free to add your own modifications to this program! The routines here have been updated and refined over the past five years, but there's plenty more tinkering to he done. If you know enough about color theory, you can write some programming to make the colors on the screen always match each other. Express your creativity and color sense with Kinetic Graphic Art!

```
10 DATA 40,24,4,80,48,2,80,48,4,160,96
,2,160,96,4,320,192,2
20 DATA 80,192,17,80,192,9,80,192,17,1
60,192,2,160,192,4
30 DIM A(3,50),G(2,15):FOR L=3 TO 15:I
F L=12 THEN L=14
40 FOR M=0 TO 2:READ A:G(M,L)=A:NEXT M
:NEXT L
50 GRAPHICS 1:? #6;"  ATARI KINETIC AR
T":? #6:? #6;"   by neil harris"
```

```
60 ? #6:? #6:? #6;"1. CELESTIAL SPHERE
S":? #6;"2. REFLECTED SPHERES"
70 ? #6;"3. SQUIRALS":? #6:? #6;"4. ST
RING ART":? #6:? #6;"5. LIGHT SHOW"
80 ? "TYPE 2 NUMBERS, SEPARATED BY COM
MAS":? "FOR PICTURE TYPE AND GRAPHIC M
ODE";:INPUT A,M
90 IF A<1 OR A>5 OR M<3 OR M>15 OR M=1
2 OR M=13 THEN 80
100 GRAPHICS M+16:DEG
110 ON A-1 GOTO 300,500,700,900
140 CX=G(0,M)/2:CY=G(1,M)/2
150 DX=INT(RND(1)*CX)
160 DY=INT(RND(1)*CY)
170 C=INT(RND(1)*(G(2,M)-1)):BA=708:IF
 M=10 THEN BA=705
180 POKE BA+C,INT(RND(1)*256):COLOR C+
1
190 FOR L=0 TO 180 STEP (CX+CY+3-DX-DY
)/((CX+CY)/7)
200 X=DX*COS(L):Y=DY*SIN(L)
210 PLOT CX-X,CY-Y:DRAWTO CX+X,CY+Y
220 NEXT L:POKE 77,0:GOTO 150
300 CX=INT(RND(1)*G(0,M)*0.4+2)
310 CY=INT(RND(1)*G(1,M)*0.4+2)
320 DX=INT(RND(1)*CX):DY=INT(RND(1)*CY
)
330 CX=G(0,M)/2-CX:CY=G(1,M)/2-CY
340 COLOR INT(RND(1)*(G(2,M)-1))+1
350 A=G(0,M)/2:B=G(1,M)/2
355 FOR L=0 TO 179 STEP 30-M
360 FOR X=-1 TO 1 STEP 2:FOR Y=-1 TO 1
 STEP 2
370 PLOT A+X*CX+DX*COS(L),B+Y*CY+DY*SI
N(L)
380 DRAWTO A+X*CX-DX*COS(L),B+Y*CY-DY*
SIN(L)
390 NEXT Y:NEXT X
400 IF RND(1)>0.1 THEN 430
410 C=INT(RND(1)*(G(2,M)-1)):BA=708:IF
 M=10 THEN BA=705
420 POKE BA+C,INT(RND(1)*256)
430 NEXT L:POKE 77,0:GOTO 300
500 D=INT(RND(1)*5+1):T=INT(RND(1)*3+1
):L=INT(RND(1)*359+1)
510 TRAP 100
520 COLOR 1
530 X=G(0,M)/2:Y=G(1,M)/2
540 PLOT X,Y
550 AN=AN+L:IF AN>360 THEN AN=AN-360
560 X=X+D*COS(AN):Y=Y+D*SIN(AN):DRAWTO
 X,Y:D=D+T:GOTO 550
700 FOR L=0 TO 3:FOR K=0 TO 50:A(L,K)=
0:NEXT K:NEXT L:X=0:B=0:C=0
710 H=INT(RND(1)*(G(2,M)-1)+1):BA=708:
IF M=10 THEN BA=705
720 POKE BA+H,INT(RND(1)*8)*16+INT(RND
(1)*4+4)
730 X1=INT(RND(1)*G(0,M)):X2=INT(RND(1
)*G(0,M)):Y1=INT(RND(1)*G(1,M)):Y2=INT
(RND(1)*G(1,M))
740 COLOR 0:PLOT A(0,X),A(1,X):DRAWTO
A(2,X),A(3,X)
750 B=B-1:IF B>0 THEN 770
760 B=INT(RND(1)*10+10):BX1=INT(RND(1)
*9-4):BX2=INT(RND(1)*9-4):BY1=INT(RND(
1)*9-4):BY2=INT(RND(1)*9-4)
770 C=C-1:IF C>0 THEN 790
780 C=INT(RND(1)*10+5):H=INT(RND(1)*(G
(2,M)-1)+1):POKE BA+H,INT(RND(1)*256)
790 COLOR H:PLOT X1,Y1:DRAWTO X2,Y2
795 A(0,X)=X1:A(1,X)=Y1:A(2,X)=X2:A(3,
X)=Y2
800 X=X+1:IF X>50 THEN X=0
810 X1=X1+BX1:IF X1<0 OR X1>G(0,M)-1 T
HEN BX1=-BX1:GOTO 810
820 X2=X2+BX2:IF X2<0 OR X2>G(0,M)-1 T
HEN BX2=-BX2:GOTO 820
830 Y1=Y1+BY1:IF Y1<0 OR Y1>G(1,M)-1 T
HEN BY1=-BY1:GOTO 830
840 Y2=Y2+BY2:IF Y2<0 OR Y2>G(1,M)-1 T
HEN BY2=-BY2:GOTO 840
850 GOTO 740
900 COLOR 1:POKE 708-4*(M=10),INT(RND(
1)*256)
910 X=INT(RND(1)*G(0,M))
920 Y=INT(RND(1)*G(1,M))
930 S=INT(RND(1)*4+2)
940 FOR L=0 TO G(0,M)-1 STEP S
950 PLOT L,0:DRAWTO X,Y:DRAWTO G(0,M)-
1-L,G(1,M)-1
960 NEXT L
970 FOR L=0 TO G(1,M)-1 STEP S
980 PLOT G(0,M)-1,L:DRAWTO X,Y:DRAWTO
0,G(1,M)-1-L
990 NEXT L:FOR L=1 TO 1000:NEXT L:GOTO
 100
```

"All the Trig You Need"

The sine *and* cosine *functions built-in to your Atari BASIC calculate the position of a point on circle. All you have to know is its angle. Diagram 1 illustrates this. For example, if the circle has a radius of 1, the X coordinate is the cosine of the angle, and the Y coordinate is the sine. If the angle is 90 degrees, the cosine is 0, and the sine is 1, beginning the pattern at the topmost point on the circle.*



For a circle with a radius of 1, the X,Y of any point on the circle is X = COSα, Y = SINα

Once you have a good understanding of this definition, you can plot any variety of circular shapes on the screen. This is how the first two patterns work to form ovals: the computer draws line connecting point on the outside of the oval. This simple one-line program demonstrates this:

```
10 DEG: GRAPHICS8:FOR L = 0 TO 360:PLOT
   160 + 50*COS(L),96 + 50*SIN(L):NEXT L
```

The 160 and 96 in the PLOT statement center the circle on the screen. Multiplying the number by 50 makes the circle larger.

MILLIPEDE

A Hyperactive Centipede

Millipede can be best described as a hyperactive version of Centipede. There are more jeepers, creepers, flying hugs, and scuttling critters scampering about the screen adding to the excitement.

Like Centipede, Millipede's primary character is the many-legged critter who slinks steadily down through the mushroom patch, turned away only by your quick reflexes and sure aim.

While Centipede begins with a spider gently bouncing in from the sidelines and the centipede trickling in from the top of the screen, Millipede blasts into action. A horde of spiders begin their *danse macabre* above DDT traps, followed closely by a squadron of bee bombardiers racing in for the kill. SWAT!

Before you can catch your breath, beetles begin dropping down and crawling along the bottom of the screen. You have only two options: to sidestep them by moving to the opposite edge of the screen or to hop frantically over them as they march by. When they ascend to the exit level it's time for your revenge—if you're quick on the trigger and your nerves aren't already frayed to the breaking point.

The pace continues to escalate as hopping spiders appear in pairs on top of DDT pods. You fire into a DDT pod to blip those spiders into web heaven. Points for spiders depend on how close they are to catching you when you send them to the hig spider graveyard in the sky.

Shooting a DDT pod is a sure way to wipe out armies of bugs, critters, and creepies in one fell swoop. But you have a limited number of pods available, so don't waste them just to get that 800-point bonus for releasing pesticide into your bug garden. Save those DDT pods for the end of the level, when things get really rough!

While all this assorted action is taking place, low and slow inchworms hump across the screen making juicy targets, good for 100 points.

If that's not enough, bees boom and zoom across the screen, leaving mushroom trails in their wake. They're fairly easy to pick off since they head straight down and off the screen. Sniping at bees is a fast way to pick up 200 points at a swat.

Mosquitos are trickier. They drone quickly across the screen at a slant, and it's hard to hit them (pardon the expression) on the fly. The best way to zap a mosquito is to travel along with one while firing all over the place.

There are also pincherbugs, creepy creatures that crawl across the top of the screen, leaving a path of poisoned mushrooms in their trail. Zap them fast! They're not only worth 1000 points each, but if the millipede bumps into a poisoned mushroom it hallucinates, forgets to go across the screen, and heads straight down. When faced with a falling millipede, aim for its first section, and fire until there's nothing left—or give up.

Swarms of bugs mount an attack as you advance to the upper levels of play. Keep an ear tuned to the sound effects for the steady hummmm of an oncoming attack of mosquitos, dragonflies, or bees.

I like Millipede because it's a great way to get out my aggressions. I used to play Centipede for the same reason; now I play it to relax after a round of Millipede.

Myrna Rae Johnson

Moonlighting With Your Personal Computer

by
Robert J. Waxman
World Almanac Publications
159 Pages, paperback, $7.95

It's every hohhyist's dream. You really can make money in your spare time working in the comfort of your own home using your personal computer! But it's not easy money. Work is work, and profitable work is usually hard work. But it is true that owning a personal computer affords you special opportunities for moonlighting or even building your own full-time business. Robert J. Waxman's new book, Moonlighting with Your Personal Computer, can help you explore and exploit this opportunity.

Waxman's premise is that you can use your personal computer in a variety of ventures that allow you to earn extra income without giving up the security of your present joh. Should these moonlighting activities eventually blossom, you could become a full-time entrepreneur and enjoy the independence, satisfaction, and financial rewards of owning your own business.

In clear, mostly jargon-free language (computer novices fear not) Waxman details the six most opportune areas for the computer moonlighter: freelance writing, becoming a contract bureau specialist, consulting, packaged program writing, contract programming, and setting up systems houses. In each case, Waxman explores the type of computer equipment required, standard fees, hours required, and marketing techniques.

The importance of sounding out the marketplace is a recurrent theme in Waxman's book. At the onset he advises the computer moonlighter to "develop a service or product that someone is willing to buy, and then make that service known to those who wish to buy it." Sound marketing advice for the potential entrepreneur, whether computer moonlighter or widget manufacturer!

Waxman devotes a full chapter to the mechan of running your own business. He covers the impor tance of accurate record keeping, incorporation pros and cons, and taxation. He also includes appendices and glossaries that cover everything from computer clubs and magazines to programming languages and software distributors.

Waxman does occasionally lapse into pipe-dreamy prose. However, he is also careful to admonish the reader about the pitfalls of computer moonlighting. He takes the reader step by step through each moonlighting category, anticipating problems and warning against the fantasy that your home computer is a guaranteed path to riches.

J.D. Bass

An Awesome Performance!

Get in Shape with Track and Field™

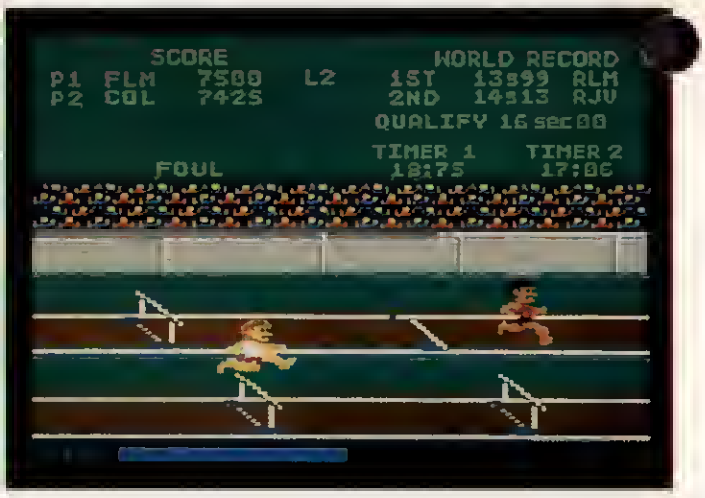
Just in case you were passed over for the Olympic Games, you now have a chance to demonstrate your gold medal potential—right in your own home.

Even if you're not a pro, Track & Field, Atari's official home video game of the 1984 Olympics, offers the excitement of competing in six classic Olympic events: the 100-meter dash, long jump, javelin, 110-meter hurdles, hammer throw, and high jump.

In this two-player game (against the computer or an opponent) you use either a joystick or a special Track & Field arcade-style controller that comes with the game. Beginning with the dash and ending with the highjump, you must earn a qualifying score before proceeding to the next event. You accomplish this by beating a qualifying time or speed for each event.

To warm up, you can practice each event before you go for the gold. You don't have to qualify to progress through each event in the practice mode. But at the same time, you don't earn qualifying scores. It's not a bad idea to use the practice mode first. Even athletes will find this game challenging.

The sound and graphics in Track & Field are close to the real thing. The athletes really perform like athletes, down to the muscles in their calves. And the roar from the spectator's stand is enough to send chills up and down your spine!



Track & Field is available on a cartridge for your Atari home computer, the 5200 SuperSystem and the 2600 VCS. The 2600 version does not have a practice mode and the athletes look less realistic. However, this rendition has three levels of difficulty, an option denied the computer and 5200 versions.

Elizabeth Metzger

Track & Field is available in cartridge. Requires 16K RAM and joystick. Track & Field controller is included. Second Track & Field controller optional. Suggested retail price: $47.95. Also available in cartridge for the Atari 5200 SuperSystem, suggested retail price: $39.95 and for the 2600 VCS, suggested retail price: $34.95.

Dr. C. Wacko's Amazing Word Processor

By David L. Heller

If you've got a strong constitution, walk into a hot stuffy room filled with wacked-out programmers (all munching stale tuna fish sandwiches), give them the same problem, and they'll all solve it in their own unique and creative way.

I'll give you an example. I walked into a room full of wackos (and wackettes) and asked them to create a simple version of the game black jack (21) to play against the computer.

Captain Action's first thought was to use a joystick for the player/computer interface. Ms. Peeky felt that touching the keys was more reassuring, and Petunia went high-tech and decided to get information into the computer by using a light pen. Junior had no comment.

Right off the bat, I knew that these four weirdos would design their programs differently. But it goes even deeper than individuality. The logical thought process that each programmer goes through while creating a program is unique. He or she can effectively solve the same problem in many different ways.

Pay Attention to Detail, Especially When Making Anchovy Burritos

Programming is just like making anchovy burritos for Thanksgiving dinner. You've got to work out a recipe, go shopping for the ingredients, then put it all together and cook it up. If you've paid close attention to detail, your burritos will he scrumptious. If not, you may end up with burned pots, disguntled relatives, and lots of former friends.

To show you what goes on in a programmer's brain, I'll let you take a glimpse into mine as I tell you how I designed the Mini Word Processor listed on page 80 (A word processor is just a computerized typewriter. I designed my computerized typewriter after the keys of my old electric got jammed with sand.)

Know the Rules of the Game and Define the Problem

I always write down what I want my program to do before I start doing any programming. I do this so I'll have a written framework to huild my program on. Defining the problem—by creating a written description of it—is always an essential first step, regardless of what type of program you are designing. This first step may require more of your brainpower and attention to detail than all of the actual programming! Here's what happened to me. . .

I wanted my word processor to have six principal features:

1. Show text on the screen.
2. Include at least some rudimentary editing functions.
3. Store text to disk or cassette and load it hack into the computer when needed.
4. Print out the contents of the screen onto a printer.
5. Erase the contents of memory and the screen at the press of a key.
6. Be friendly to writers. All options should be easy to remember and easy to use.

I originally thought that designing a simple word processor would be, well, simple. But after writing down all the ingredients I needed, and mulling over the programming consequences, I discovered that I had never really looked closely at the mechanics of a word processor. I had never broken it down and examined all the little details.

To write a workable program, I had to examine every feature to gain a thorough and complete understanding of it. In the process, I discovered that there was more to a word processor than meets the eye, and I now have a much better understanding of

Illustrated by JOHN JOHNSON

how a word processor operates.

Now That You Understand The Ground Rules

Once I've defined a program and have an in-depth understanding of its functions, I review each function, apply my knowledgeof the BASIC language, and add a touch of wackiness.

You can start working with any of the steps you've written down. But I usually start at the top, with the first one, and work my way down the list. This is the same way that your computer executes a program. So, working this way makes it easier to put together the total program. As you get deeper into the programming you may want to change the order of things to make your program more efficient. Go for it! This is part of the creative programming process.

The Modular Approach

I examine and work through each step, treating it as a small program unto itself, which I call a "module." I write a "shopping list" of programming ingredients needed to make each module of the program work on their own, then formulate a recipe that blends its ingredients.

After I've completed a module, I first test it by itself, and then within the entire program. Sometimes I'll design a module directly on the computer. I enter all the programming, then experiment with my module (adding a pinch of this and pinch of that) until it "tastes" just right. This method also works when making spaghetti sauce!

A Word Processor, Step-By-Step

Enough of this conceptualizing stuff. Let's design a word processor! (If you'd like to look at the finished product before we begin, just flip to page 80, type in the program, and start writing that great novel.) All set?

OK, but I'd like to point out one thing before we start designing and programming. The line numbers I use below to explain each module are the same I've used in the finished word processor. This will help you see how it all fits together.

MODULE 1: Print to the Screen

The first thing a word processor must do is print text on the screen. So, I designed Module 1 to do just that.

Module 1

```
50 CLR :DIM S$(20),L$(20),B(2500)
55 REM ***PRINT TO SCREEN***
60 X=1:GRAPHICS 0
70 CLOSE #1:OPEN #1,4,0,"K:"
80 GET #1,A
85 REM ***OPTIONS***
160 ? CHR$(A);
170 B(X)=A
180 X=X+1:GOTO 80
```

Line 50 DIMensions S$ for use in the Save Text Module that comes later and L$ for use in the Load Text Module. Most important, it DIMensions the array B that's used to store the text in line 170 of this module.

Type in and run Module 1. You've got a very rudimentary word processor. Each character you type is printed on your screen, and stored in array B!

The OPTIONS, like printing, saving, loading, erasing, and editing the text will fit between lines 80 and 160 of the program.

MODULE 2: Edit

Everything was hunky-dory until I discovered that each time I corrected text by pressing the DELETE BACK S key, the ATASCII value of the DELETE key, 126, was stored in array B.

This just wouldn't fly. I realized that if I tried to print or save the text, these extra characters would get in the way and bollix up the works. I had to come up with a way to delete each character on the screen, without placing the ATASCII value of the DELETE key into the array.

Here's the solution I finally came up with, after much experimentation, and futzing around:

Module 2

```
100 IF A=126 THEN ? CHR$(A);:X=X-1:GOT
O 80:REM Editing Function
```

I inserted this short module into Module 1, and solved the problem. Here's how it works. If you press the DELETE BACK S key, A equals 126. When this happens the program prints the control character for DELETE on the screen, and the cursor moves one space to the left and erases the character it land on.

X = X – 1 is the heart of this module. Each time the cursor does its thing on the screen, the array counter is set back one notch.

To finish things off, the program returns to line 80 to GET the next character.

The solution looks pretty straightforward here. But it took me quite a bit of experimentation to arrive at the result I was looking for. One lesson I learned while working through this problem was to have a very clear idea of the result I wanted before I tried to find a solution. It all gets back to defining the problem!

MODULE 3: Saving Text

I wanted to design this module to make saving text as easy as possible. Here's how I wanted it to work:

1. Press OPTION + "S" or "s" and the screen clears.
2. A message appears on the screen asking for a device and filename.
3. You enter info and press RETURN.
4. If you make a mistake in entering info, the program goes back to line 70 for another try.
5. Otherwise, text that is stored in array B(X) is saved to the proper device. The text is printed on the screen during this process.
6. After the text is stored, the program goes back to line 70 to start again.

Once I had written down what I wanted to accomplish, I started programming. Here's the result:

Module 3

```
115 REM GOTO the Save Text Routine
120 IF A=83 AND PEEK(53279)=3 OR A=115
```

```
 AND PEEK(53279)=3 THEN GOTO 200
195 REM ***SAVE***
200 CLOSE #1:OPEN #1,12,0,"E:"
210 POSITION 3,10:? "[SAVE] DEVICE:FIL
ENAME ";
220 INPUT #1,S$
230 CLOSE #1:TRAP 370:OPEN #2,8,0,S$:P
OKE 712,195:POKE 710,195:? CHR$(125)
240 FOR T=1 TO X-1
250 PUT #2,B(T):? CHR$(B(T));:NEXT T
260 CLOSE #2:? CHR$(253);:POKE 710,148
:POKE 712,148:GOTO 70
```

GOTO the Save Text Routine. In line 120, if you press an uppercase letter "S," A equals 83. If you press a lowercase "s," A equals 115. And, if the OPTION key is pressed at the same time, the program goes to the Save Text Routine beginning on line 200.

The Save Text Routine. In line 200, channel #1 is first closed, then opened to allow writing to and reading from the screen editor. This action also clears the screen and sets the stage for the printing in line 210 and the INPUT, less question mark, in line 220.

Line 210 prints a message on the screen asking for a device and filename.

Line 220 waits for an INPUT, then assigns it the string variable name S$

Line 230 closes the screen editor (channel #1), then uses a TRAP statement to trap any input errors to line 370. A channel is then opened to the device you specified in line 220, and finally, the screen is colored green and cleared.

The FOR/NEXT loop in Lines 240 and 250 takes each character from array B(T) and PUTs it into the file on whatever device is selected.

When the FOR/NEXT loop runs out of characters, the program branches to line 260 where channel #2 is closed and a huzzer sounds to let you know that the saving process is complete. The screen turns blue, and the program goes back up to line 70.

MODULE 4: Loading Text

To keep things simple, I designed this module to load text like the module that saves text. Here's how I wanted it to work:

1. Press OPTION + "L" or "1" and th screen clears.
2. A message appears on the screen and asks for a device and filename.
3. You enter info and press RETURN.
4. If you make a mistake in entering info, the program goes back to line 70 for another try.
5. Otherwise, text is loaded into array B(X). The text is printed on the screen during this process.
6. After the text is loaded into the computer the program goes back to line 70.

By making the save and load features of this word processor similar, I eased my programming chores and made the program easy to use. Here's the Module 4 part of this program:

Module 4

```
135 REM GOTO the Load Text Routine
140 IF A=76 AND PEEK(53279)=3 OR A=108
 AND PEEK(53279)=3 THEN B(X)=32: GOTO
 270
265 REM ***LOAD***
270 CLOSE #1:OPEN #1,12,0,"E:"
280 POSITION 2,10:? "[LOAD] DEVICE:FIL
ENAME ";
290 INPUT #1,L$
300 CLOSE #1:TRAP 370:OPEN #2,4,0,L$:O
PEN #1,8,0,"S:":POKE 712,195:POKE 710,
195:X=1
310 TRAP 350:GET #2,A
320 PUT #1,A
330 B(X)=A:X=X+1
340 GOTO 310
350 CLOSE #1:CLOSE #2
360 ? CHR$(253);:POKE 712,148:POKE 710
,148:GOTO 70
```

GOTO the Load Text Routine. This routine is almost identical to the GOTO Save Text Routine you've just seen. There's one small difference, however. Before this routine goes to line 270 (the Load Text Routine), it enters a blank space (32) into array B(X). After much experimentation, I discovered that this space was needed for proper screen formatting. Remove B(X) = 32 from line 140, run the program, and you'll see what I mean.

The Load Text Routine. This routine is almost identical to the Save Text Routine. But, it GETs characters from either disk or cassette and PUTs them into array B(X).

MODULE 5: Printer

I decided that it would be nice to add a feature so you can print the contents of the screen to a printer. And here's the module that does this. . .

Module 5

```
88 REM GOTO Printer Routine
90 IF A=80 AND PEEK(53279)=3 OR A=112
AND PEEK(53279)=3 THEN GOTO 190
185 REM Printer Routine
190 LPRINT CHR$(155): CLOSE #1: OPEN #
2,8,0,"P:": FOR T=1 TO X-1: PUT #2,B(T
): NEXT T:CLOSE #2: GOTO 70
```

GOTO the Printer Routine. In line 90, if you press an uppercase letter "P," A equals 80. If you press a lowercase "p," A equals 112. And, if you press the OPTION key at the same time, the program goes to the Printer Routine beginning on line 190.

Printer Routine. The Printer Routine on line 190 performs several functions:

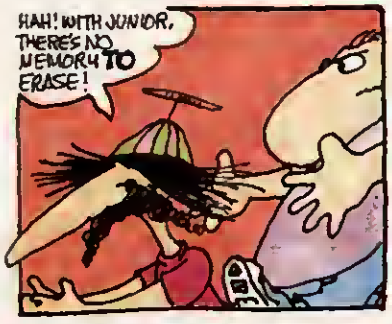
1. It prints a carriage return on the printer so printing

begins at the left side of the paper.
2. It closes channel #1 then opens channel #2 to the printer.
3. The FOR/NEXT loop PUTs the contents of the array onto the printer. It goes to X-1 so the extra carriage return or space at the end of the text isn't printed.
4. When printing is completed, it closes channel #2 and goes back to the main program beginning, on line 70.

Ending Text with a Carriage Return

While experimenting with the Printer Routine, I was surprised to discover that I had to end the text to be printed with at least one carriage return. When I didn't press RETURN before printing, the printout wasn't the same as the information printed on the screen. This taught me a very valuable lesson: *Always "plug modules in" and test them before moving on.*

MODULE 6: Clear Screen and Erase Memory



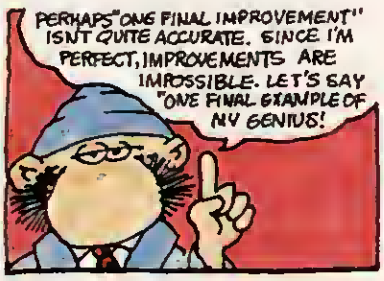
I designed this short module so you can clear the screen and memory by pressing the CTRL key plus the upper caseletter "E." I selected the letter "E" to represent "Erase," so the operation would be easy to remember.

Module 6

```
150 IF A=5 THEN GOTO 50:REM CTRL+E Cle
ars the screen
```

Simple, isn't it? If you press the CTRL key and the "E" key A equals 5, and the program goes to line 50 and begins again.

Module 7: One Final Improvement



Since most novels are longer than twenty-four screen lines, I decided to incorporate a feature that lets you scroll a document to read and review it.

Look at the routine first, then I'll explain how it works and how it's used.

Module 7

```
130 IF A=18 THEN ? CHR$(125);: FOR T=1
 TO X-1: ? CHR$(B(T));: NEXT T: GOTO70
```

If you press the CTRL and "R" keys at the same time, A equals 18 and the screen is cleared. Then, the FOR/NEXT loop is used to print the contents of the array on the screen. When the printing is finished, the program goes back up to line 70.

Here's how to use the "Read" feature:

1. Press the CTRL key plus the "R" key to start the scrolling
2. Press the CTRL key plus the "I" key to pause; press them again to continue scrolling.

Error Handling

The routine on line 370, below, was put into the program after I added the routine on line 130 that lets you scroll long text down the screen.

```
370 ? CHR$(125);:A=18:GOTO 130
```

In essence, if an error occurs in line 230, the program goes to line 370, branches up to line 130, and finally to line 70 to start again. This may seem like the long way around, but if you review the Text Scrolling Routine, it will all become clear.

The Word Processor That Ate Cleveland

As I designed this program I kept wanting to add more features. I thought it would be nice to add a "wrap-around" feature to automatically shift (wrap) the last word of a line to the left margin of the next line. This common feature on most professional word processors eliminates pressing RETURN at the end of each line.

I also wanted to add printer functions that would automatically center text, line up text evenly on the right-hand side of the printout, and underline or highlight words.

I also thought that incorporating a "search and replace" feature would be real helpful. And, most of all, I wanted to make use of all the editing functions; not just the DELETE BACK S.

But I knew that if I added all these features, the program would be extremely long and difficult to explain, and you wouldn't have a chance to experiment on your own!

Keep the Cards and Letters Coming!

I'd like to see your modified versions of this word processor. So, if you make some additions, please send me a short note and your program listing c/o Atari Explorer. Dr. Wacko will answer you. Trust me!

Adding Some Documentation

Once you've finished your program, worked out the bugs, and really think it's got possibilities, it's time to write operating instructions so your friends can use it. To give you the idea, here's the documentation for Wacko's Amazing Word Processor.

Wacko's Amazing Word Processor

This word processor lets you create text (up to 2500 characters in length) on your screen, save it to either disk or cassette, and print the contents of the screen to a printer.

Easy Operating Instructions

1. **Getting Started.** A title page appears on your screen after you load and run your word pro-

The six most commonly used excuses for bad spelling.

It was three o'clock in the morning...

I was in a real rush.

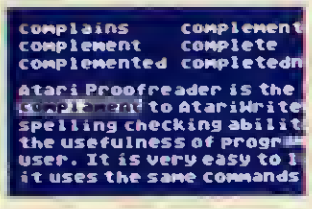
It was only a typo...

My computer did it.

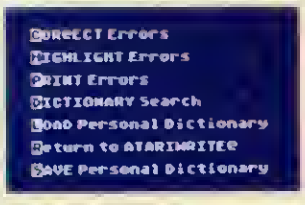
My printer messed up.

I didn't have ATARI Proofreader.

There's no excuse for excuses. Because ATARI Proofreader catches every spelling error. And highlights it unmistakably.



The built-in spelling dictionary includes over 36,000 words. And you can create your *own* dictionary of special words. So you'll look up the correct spelling for *any* word right on your screen.



Proofreader is as easy to use as AtariWriter. Because it's designed exclusively *for* AtariWriter.™ In fact, it only takes about five minutes to review a 1500-word document. And five minutes is not much of an excuse for turning out documents with spelling errors. No matter how late it is.

The *ATARI*® Proofreader™
Now there are no more excuses

cessor. Just press the START key and you're ready to begin typing.

2. **To Save Your Text.** Press the OPTION key and the "S" key simultaniously, and your screen will look like this:

[SAVE] DEVICE:FILENAME

Type a letter "D," a colon (:), and a filename, then press RETURN to save your text to disk. Your entry should look like this:

D:FILENAME.EXT [RETURN]

Type a letter "C," followed by a colon (:), then press RETURN to save your text to cassette. No file name is required.

3. To Load Text into the Word Processor. Press the OPTION key and the "L" key and your screen will look like this:

[LOAD] DEVICE:FILENAME

Type a letter "D," a colon (:) and the name of the file stored on disk, then press RETURN to load the text into the word processor. Your entry should look like this:

D:FILENAME.EXT [RETURN]

Type a letter "C," followed by a colon (:), then press RETURN to load the text from cassette into the word processor. No file name is required.

4. **To Print Text on Your Printer.** Press RETURN at the end of the text you want to print. Then press the OPTION key and the "P" key and your text will be printed out. Don't forget to turn on your printer!

5. **Editing.** The only editing function available on this word processor is the DELETE BACK S key. Each time you press the DELETE BACK S key the cursor moves back one space and deletes one character.

The cursor will travel up the screen a maximum of three lines before stopping. If you continue to press the DELETE BACK S key, characters are still being deleted from the word processor's memory. Use the Read and Review option to see your edited text.

6. **Read and Review.** The Read and Review option is used during editing to see edited text, and to scroll and read text that is longer than the length of the screen.

Press the CTRL key and the "R" key to begin scrolling. Press the CTRL key and the "1" key to stop scrolling. Press CTRL and "1" again to continue scrolling.

Now that you know how to design and use a word processor, here's the program you've all been waiting for. Type it in carefully, run it, and write that great novel or a nasty letter to me.

Wacko's Amazing Word Processor

```
10 GRAPHICS 1+16:POKE 712,99:POSITION
5,8:PRINT #6;"DR WACKO'S":POSITION 7,1
0:PRINT #6;"AMAZING"
20 POSITION 3,12:PRINT #6;"WORD PROCES
SOR"
30 POSITION 5,20:PRINT #6;"PRESS start
"
40 IF PEEK(53279)<>6 THEN GOTO 40
50 CLR :DIM S$(20),L$(20),B(2500)
55 REM ***PRINT TO SCREEN***
60 X=1:GRAPHICS 0
70 CLOSE #1:OPEN #1,4,0,"K:"
80 GET #1,A
85 REM ***OPTIONS***
90 IF A=80 AND PEEK(53279)=3 OR A=112
AND PEEK(53279)=3 THEN GOTO 185:REM Pr
int-out. Press RETURN after text!
100 IF A=126 THEN ? CHR$(A);:X=X-1:GOT
O 80:REM Editing Function
110 IF A=155 THEN ? CHR$(171):B(X)=A:X
=X+1:GOTO 80:REM Carraige return
120 IF A=83 AND PEEK(53279)=3 OR A=115
 AND PEEK(53279)=3 THEN GOTO 200:REM S
ave file
130 IF A=18 THEN ? CHR$(125);:FOR T=1
TO X-1:? CHR$(B(T));:NEXT T:GOTO 70:RE
M Read long text. CTRL+1 Stops scroll
140 IF A=76 AND PEEK(53279)=3 OR A=108
 AND PEEK(53279)=3 THEN B(X)=32:GOTO 2
70:REM Load file
150 IF A=5 THEN GOTO 50:REM CTRL+E Cle
ars the screen
155 REM ***PRINT TO SCREEN***
160 ? CHR$(A);
170 B(X)=A
180 X=X+1:GOTO 80
185 TRAP 300:REM ***PRINTER***
190 LPRINT CHR$(155):CLOSE #1:OPEN #2
8,0,"P:":FOR T=1 TO X-1:PUT #2,B(T):N
XT T:CLOSE #2:GOTO 70
195 REM ***SAVE***
200 CLOSE #1:OPEN #1,12,0,"E:"
210 POSITION 3,10:? "[SAVE] DEVICE:FIL
ENAME ";
220 INPUT #1,S$
230 CLOSE #1:TRAP 370:OPEN #2,8,0,S$:P
OKE 712,195:POKE 710,195:? CHR$(125)
240 FOR T=1 TO X-1
250 PUT #2,B(T):? CHR$(B(T));:NEXT T
260 CLOSE #2:? CHR$(253);:POKE 710,148
:POKE 712,148:GOTO 70
265 REM ***LOAD***
270 CLOSE #1:OPEN #1,12,0,"E:"
280 POSITION 2,10:? "[LOAD] DEVICE:FIL
ENAME ";
290 INPUT #1,L$
300 CLOSE #1:TRAP 370:OPEN #2,4,0,L$:O
PEN #1,8,0,"S:":POKE 712,195:POKE 710,
195:X=1
310 TRAP 350:GET #2,A
320 PUT #1,A
330 B(X)=A:X=X+1
340 GOTO 310
350 CLOSE #1:CLOSE #2
360 ? CHR$(253);:POKE 712,148:POKE 710
,148:GOTO 70
365 REM ***SAVE/LOAD ERRORS***
370 ? CHR$(125);:A=18:GOTO 130
380 ? CHR$(125);:POKE 710,34:POSITION
4,10:? "Please Turn Printer/Interface
On!";
390 FOR WAIT=1 TO 500:NEXT WAIT:A=18:P
OKE 710,148:GOTO 130
```

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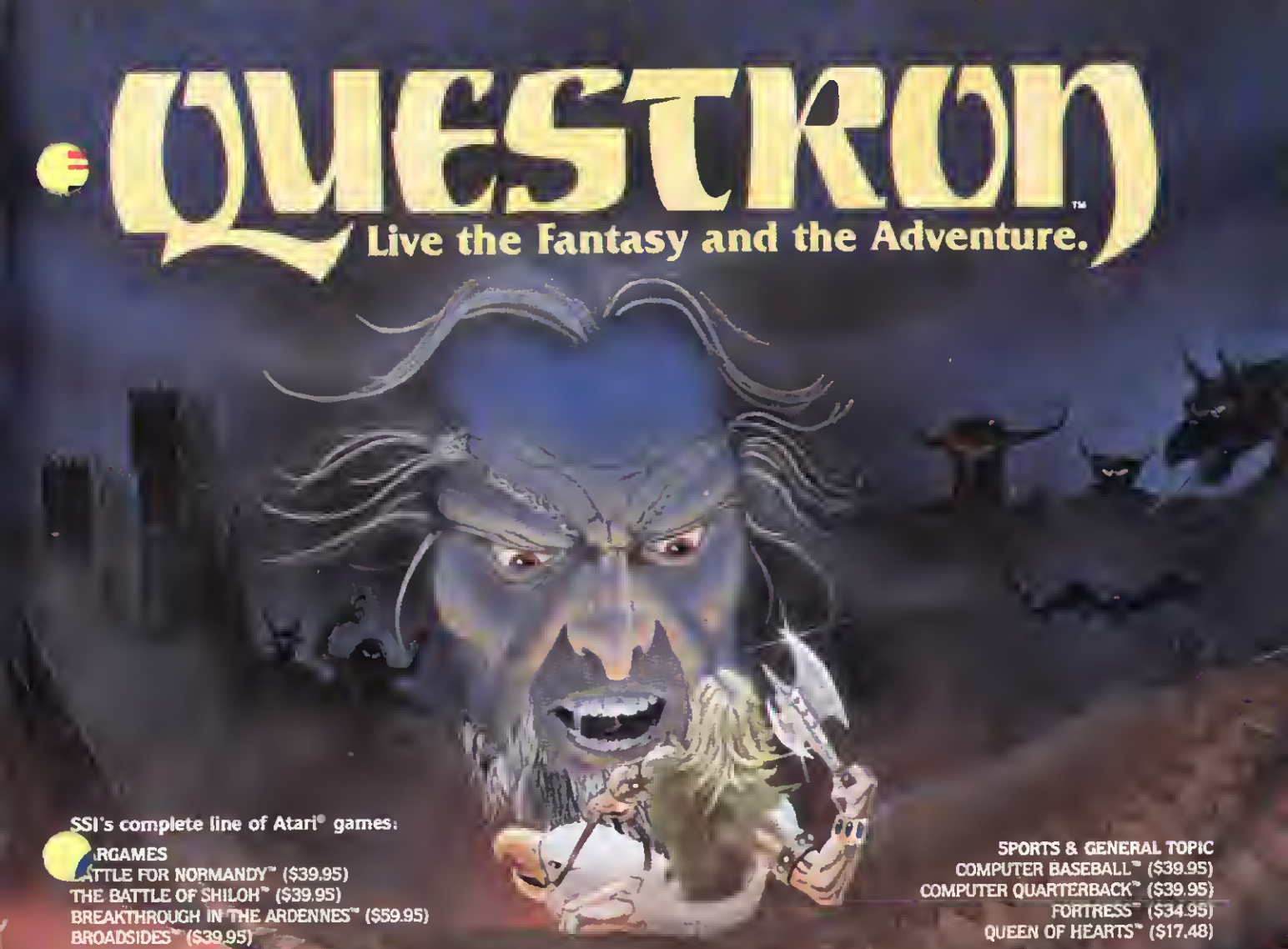

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WHAT THE WORLD IS SAYING ABOUT THE NEW ATARI CORP.

In the image of "Rocky," Atari has trimmed down and shaped up to make itself a prime contendor for scoring a knockout in the low end of the personal computer market.

Bryan Kerr, who has been with Atari for three years, said, "There is a definite difference in style between the old company and the new." He described the change by saying, "It's as though the fog had been blown away and we have a clear vision. Tramiel made our direction more concise and aggressive and we are poised to conquer the market."

Corporate Times

The best news of all for home computing is that, once again, Jack Tramiel has captured the imagination of the American public. Out of the ashes of Atari, Tramiel, who left Commodore almost a year ago, has built a new company, Atari Corp. In November, he cut the price of 64K home computing to about $100.

InfoWorld

As the founder and 25-year chairman of Commodore International Ltd., Mr. Tramiel turned the company into a dominating force in the home-computer market.

Wall Street Journal

"Mass merchants definitely want an alternative to Commodore. And the Atari 800XL is a good machine."

Clive Smith in Business Week

The man known as "the general" called, and the troops responded on a moment's notice, flying in from such places as Tokyo, Phoenix, Toronto and Philadelphia. His loyalists, all former executives of Commodore International Ltd., came to Sunnyvale to help Jack Tramiel bring Atari Corp. back...Tramiel's rationalization—that the only way to make money is to deliver to consumers the best value for their dollar—has earned him the reputation of a warrior.

San Jose Mercury News